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PREPARATION AND USE OF AUDIO-VISUAL AIDS

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THIRD EDITION

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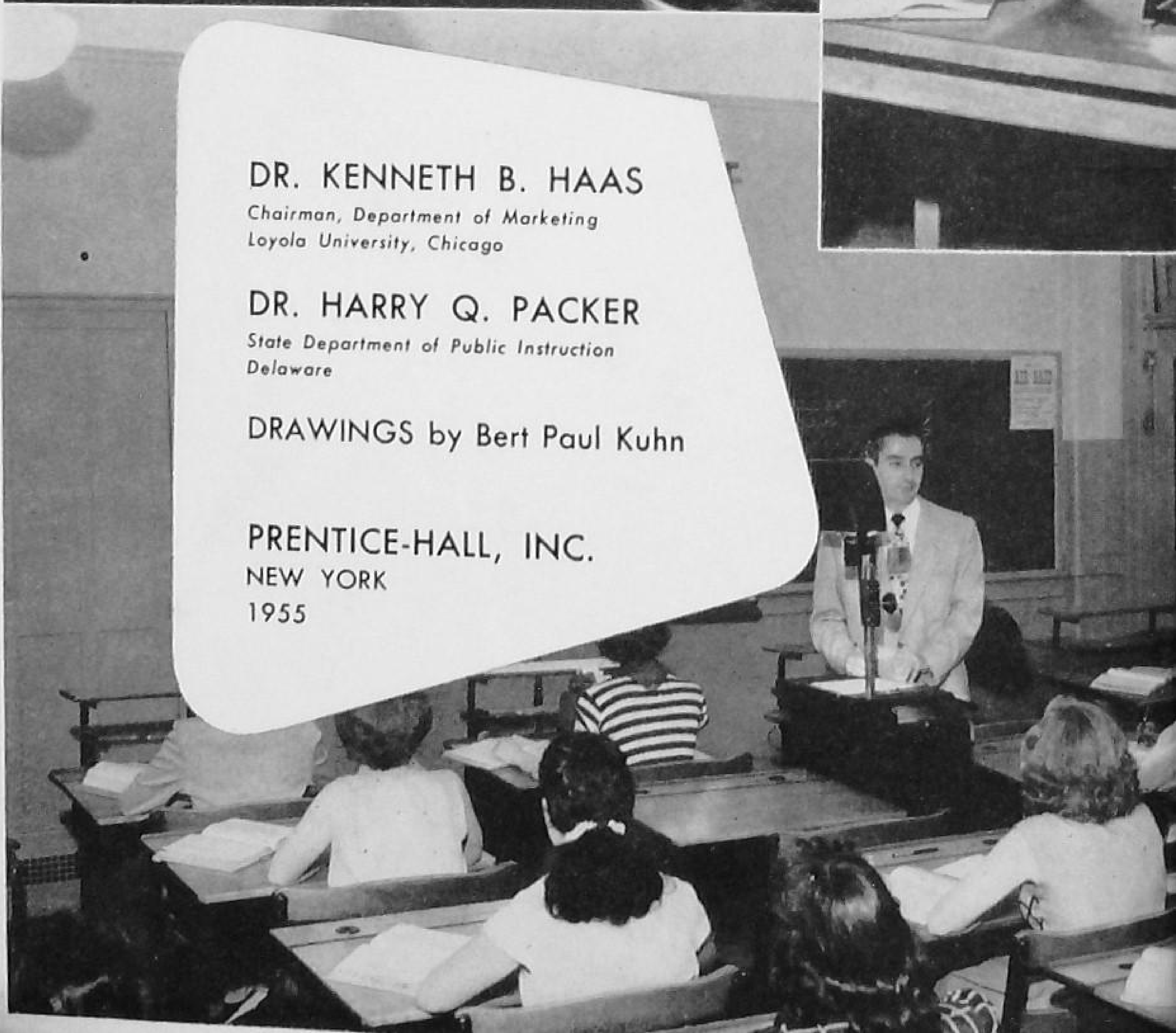

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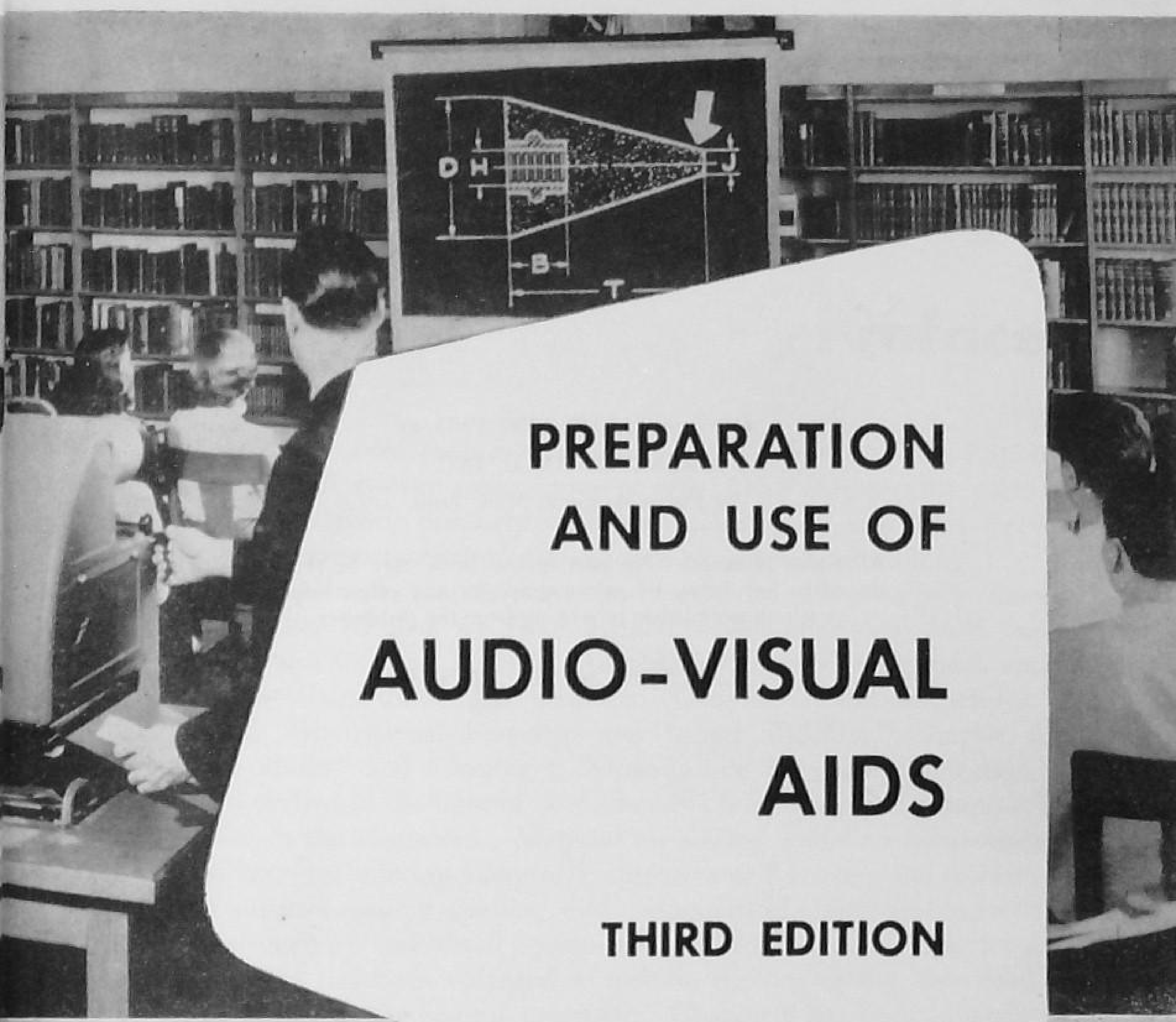

PREPARATION AND USE OF AUDIO-VISUAL AIDS

THIRD EDITION

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Preface

The need for a book such as this, clearly evident when the first edition appeared in 1946, is even more apparent now. Not only are the values of audio-visuals more precisely understood, but such aids have been accepted as an important adjunct to modern education and training.

From many instructors, trainers, and personnel directors who have used the earlier editions we have learned which additional facts and materials would be most helpful. Accordingly, extensive revisions and additions have been made in all chapters. Chapter 1, "Motion Pictures," Chapter 2, "Discussional Filmstrip and Sound Slidefilm," Chapter 3, "Teaching Slides," and Chapter 4, "Opaque and Overhead Projection," have been revised in the light of new advances in audio-visual equipment and its use in the classroom. Material on adding sound to home-made films has been included in Chapter 1; instructions for using the tachistoscope to improve reading, spelling, and mathematical ability and to facilitate visual memory and visual responses have been added to Chapter 2; and Chapter 4 has been enlarged to include the use of the "overhead" projector as well as the opaque projector. Chapter 6 has been expanded to include not only the use of flash cards in the classroom but also techniques relating to the flannel board. Chapter 8, "Pictures and Photographs," Chapter 11, "Audio-Visual Laboratory," and Chapter 13, "Radio, Recording, and Playback Equipment," have had important new material added; and Chapter 14, "Television," has been completely rewritten and modernized in line with recent developments. All sources of audio-visual aids—including motion pictures, filmstrips, sound slidefilms, slides, radio, recording and projection equipment, and other materials and equipment—have been brought up to date and arranged in easy-to-find order in the Appendices. Many new and helpful illustrations have also been included.

This new revision also has other special features:

—More than two hundred drawings, cartoons, photographs, charts, and graphs.

—Emphasis on readability and helpfulness for both novice and expert.

—Unusual comprehensiveness of subject matter.

—Exhaustive references for films, devices, equipment, and materials.

—Special chapters on methodology, showing how to use audio-visuals for maximum results.

- Plentiful and realistic questions and developmental projects with each chapter.
- Authoritative treatment by authors who have developed and worked with audio-visuals for many years and in many fields.
- Specific coverage making the content eminently applicable to educational, industrial, social, religious, and civic groups.

To those who are seeking guidance, knowledge, and skills in this vital area of education, this book will offer much.

K.B.H.
H.Q.P.

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Introduction

Montesquieu once remarked: "He who would talk with me must first define his terminology." To provide the reader with a full understanding of the subject matter of this book, the following definitions are offered.

An *instructional* aid is any device that assists an instructor to transmit to a learner facts, skills, attitudes, knowledge, understanding, and appreciation.

A *visual* aid is any instructional device that can be seen, but not heard.

An *audio* aid is any instructional device that can be heard, but not seen.

An *audio-visual* aid is any instructional device that can be heard as well as seen.

An outstanding development in modern education is the growth in the use of audio-visual aids for instruction. It is natural that in education we should appeal to the mind chiefly through the visual and auditory sense organs, since it is possible that 85 per cent of our learning begins at those terminal points. The chief objective of this book is to indicate how to prepare and use certain audio-visual aids to greatest advantage.

This book is unusual in three respects. First, the content is based on thoroughly tested experience with audio-visuals in school classrooms, laboratories, religious, social, and civic groups, industrial organizations, and commercial businesses. It should be of positive value to educators, instructors, teachers, and group leaders in all kinds of classes and levels of instruction. The ideas, concepts, and skills presented will help to speed and give direction to learning, and will also improve the learning process in all other respects.

Second, this book wastes no time with intangible, nebulous crystal gazing. The content is of immediate use. It offers not only specific facts and suggestions for the preparation and use of all audio-visual aids, it also gives specific directions on how to organize the use of audio-visuals, how to evaluate and personalize audio-visuals in class or group meetings, and how to create an instructional laboratory.

Finally, this book contains a complete list of sources of audio-visual aids, devices, information, and assistance.

Individuals may learn by engaging in a variety of activities. For example, a person can learn from *reading* books and journals, *doing* exercises, *solving* problems found in his daily work, *writing* presentations, *planning* his work, *listening* to explanations, *observing* activities around

him, *describing* things he sees, *answering* questions, *asking* questions, *dramatizing* a situation, *preparing* a demonstration, *watching* a demonstration, *seeing* or *hearing* an instructional aid or device.

It is important to remember, however, that learning will occur through participation in these activities only if the activity has the attention of the individual. Attention is secured by making the student *ready to learn*, making learning pleasant and enjoyable, and aiding the student to assimilate, exercise, or use the things being taught. The best attention compellers are audio-visual aids. They are potent starters and motivators. They add zest, interest, and vitality to any training situation. As a result, they enable students to learn faster, remember longer, gain more accurate information, and receive and understand delicate concepts, and meanings.

It cannot be overemphasized that the effective use of audio-visual aids in learning requires a skilled instructor. The effective instructor will use appropriate audio-visuals at the right time and in the right way for his particular subject. In other words, he will *personalize* his audio-visual instruction. There is no substitute for the personality and warmth of an enthusiastic, capable instructor.

A good instructor will regard audio-visual aids as *aids*. Such aids are not intended to displace good instructional techniques. They are most effective when they are employed to supplement the personality and the teaching skill of the instructor and to assist in student assimilation and application. Instructional skill that combines good audio-visuals, good textbooks, and tested teaching techniques creates an ideal learning situation. This book shows how to combine all these elements to bring about the most effective kind of instruction and learning. The technique presented in Chapter 16, for example, has been thoroughly tested, improved, and refined from many kinds of instructional situations and on many learning levels. *It has always been effective*—much more so than any other instructional process that the authors have employed, observed, or studied.

The authors have acquired their educational philosophies, concepts, and skills from ancient sources as well as from modern educators such as Allen, McKown, Morrison, Wharters, and Thorndyke. Facts about commercial devices were obtained from manufacturers and distributors, as well as from practical personal experience.

This book was written with the hope that it will assist all educators to be even more effective in a profession in which they are already giving a superlative performance.

K.B.H.
H.Q.P.

PREPARATION AND USE OF AUDIO-VISUAL AIDS

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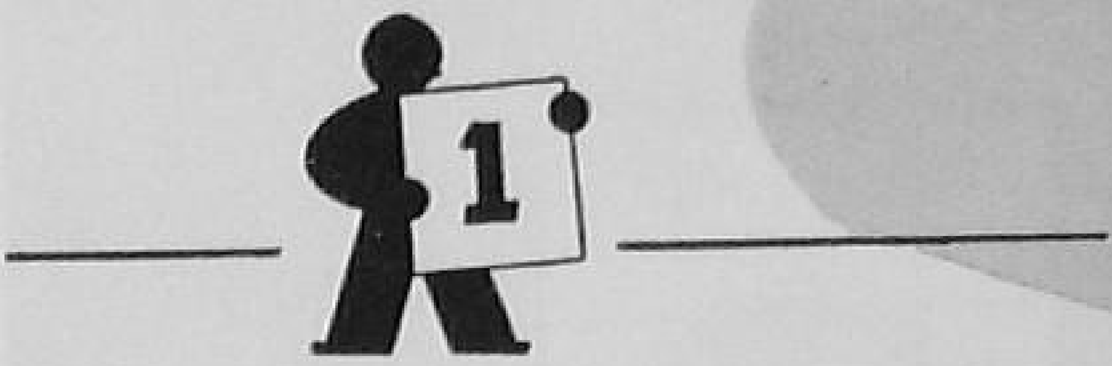
Courtesy of Bell and Howell Co.

Using motion pictures to develop knowledge, attitudes, and skills.



Motion Pictures

"One picture is worth 10,000 words" is a time-honored generalization that may or may not be entirely accurate. Nevertheless, skillful use of pictures has resulted in highly successful instruction, which proves that teaching may be done much more effectively by pictures than by words alone.

A single picture is effective, but pictures presented in sequence have an accumulative effectiveness. When pictures are shown in sequence at the rate of twelve each second, they give the impression of motion or animation in the objects portrayed. If the sequence is arranged in the proper order and used in the correct manner, the pictures pack a terrific punch.

So that the most effective use may be made of motion pictures, certain information and skills must be made a part of the working kit of the individual who uses them for teaching purposes.

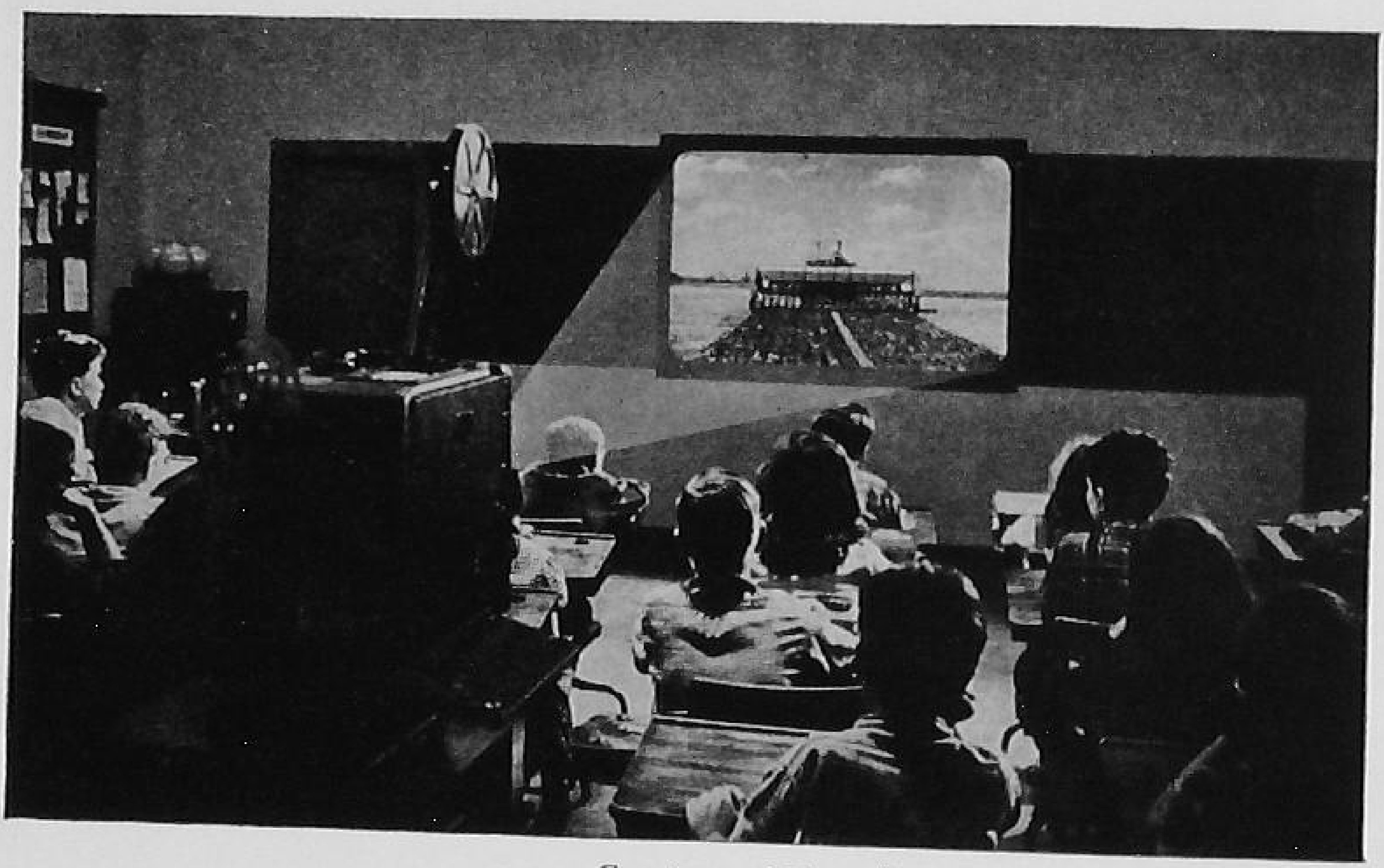
The necessary information and skills should be acquired in the following order of use:

1. Where to obtain appropriate films
2. How to use motion pictures
3. How to operate motion picture projectors
4. How to make a teaching motion picture
5. School-made motion pictures

6. Content for a home-made film
7. "Do's" for using motion pictures in teaching

Where to Obtain Appropriate Films

Probably the most vexing question in the mind of the instructor is "Where can I get appropriate or related teaching films for my field?" Any instructor can have a wealth of teaching films at his finger tips by securing film catalogues of several of the organizations listed on pages 2 and 3.



Courtesy of Encyclopaedia Britannica Films, Inc.

Selected experiences in the classroom with motion pictures.

The motion pictures referred to below are usually 16 mm. films, silent or sound, black-and-white or colored, and may be obtained (1) free, (2) for a small shipping charge, (3) on a nominal rental basis, or (4) by purchasing outright. All necessary information, including the nearest film source, is included in the catalogues. Catalogues are usually available free of charge. However in some cases a charge is made.

Sources of Motion Picture Catalogues

1. American Council on Education, 744 Jackson Place, Washington 6, D. C. Free.
2. Audio-Visual Extension Service, School of Business and Civic Administration, 17 Lexington Avenue, New York 10, N. Y. Free.
3. Bell and Howell Company, 7100 McCormick Road, Chicago, Ill.

4. British Information Service, 30 Rockefeller Plaza, New York, N. Y. Free.
5. Business Education Films, Film Center Building, 930 Ninth Avenue, New York 36, N. Y. Free.
6. Business Screen, 812 Dearborn Street (North), Chicago, Ill.
7. Carl F. Mahnke Productions, 215 E. Third Street, Des Moines, Iowa. Free.
8. Castle Films, Inc., 445 Park Avenue, New York, N. Y. Free.
9. Coronet Instructional Films, Inc., Coronet Building, Chicago, Ill. Free.
10. DeVry Corporation, 1111 Armitage Avenue, Chicago, Ill.
11. Educational Screen, 64 E. Lake Street, Chicago, Ill.
12. Educators Progress Service, Randolph, Wis.
13. E. I. du Pont De Nemours and Company, Wilmington 98, Del. Free.
14. Encyclopedia Britannica Films, Inc., 1841 Broadway, New York, N. Y. Free.
15. General Motors Corporation, 3044 West Grand Boulevard, Detroit 2, Mich. Free.
16. H. W. Wilson Company, 950 University Avenue, New York, N. Y.
17. Institute of Visual Training, 40 E. 49th Street, New York 17, N. Y. Free.
18. International Film Bureau, Inc., 57 East Jackson Boulevard, Chicago 4, Ill. Free.
19. The Jam Handy Organization, 2821 East Grand Boulevard, Detroit 11, Mich. Free.
20. Lily-Tulip Cup Corporation, 122 East 42nd Street, New York 17, N. Y. Free.
21. Modern Talking Picture Service, 45 Rockefeller Plaza, New York 20, N. Y. Free.
22. Motion Picture Bureau, 347 Madison Avenue, New York, N. Y. Free.
23. Museum of Modern Art, 11 West 53rd Street, New York, N. Y. Free.
24. National Association of Manufacturers, 14 West 49th Street, New York 20, N. Y.
25. National Film Board, 84 E. Randolph Street, Chicago, Ill. Free.
26. Photo and Film Department, National Audubon Society, 1130 Fifth Avenue, New York 28, N. Y.
27. Princeton Film Center, Princeton, N. J. Free.
28. Remington Arms Company, Inc., Peters Cartridge Division, Bridgeport 2, Conn. Free.
29. Teaching Films Custodians, Inc., 25 W. 43rd Street, New York, N. Y.
30. United States Department of Agriculture, Office of Information, Washington, D. C. Free.
31. U. S. Film Service, Federal Security Building, Washington, D. C. Free.
32. U. S. Office of Education, Federal Security Building, Washington, D. C. Free.
33. U. S. Office of Education, Superintendent of Documents, Government Printing Office, Washington 25, D. C. Free.
34. U. S. Steel Corporation, 208 S. LaSalle Street, Chicago, Ill. Free.
35. Visual Instruction Section, General Electric Company, Schenectady, N. Y. Free.
36. Walter O. Gultohn, Inc., 21 W. 45th Street, New York 18, N. Y. Free.
37. Westinghouse Electric and Manufacturing Company, 306 Fourth Avenue, Box 1017, Pittsburgh 30, Pa. Free.
38. Young America Films, Inc., 18 E. 41st Street, New York, N. Y. Free.

This partial list indicates some of the motion picture catalogues now available for your use. There are many others. Consult your local audio-visual dealer and the audio-visual libraries of your state university and state department of education for their catalogues. These listings should be added to your basic source list.

Subjects Covered in Film Catalogues

The following are only a few of the areas of subject matter covered in the above sources:

Aeronautics
Agriculture
Algebra
American History
American Literature
American Problems
Ancient History
Arithmetic
Art
Band
Biology
Bookkeeping
Botany
Business Arithmetic
Business English
Business Law
Character Education
Chemistry
Civics
Clothing
Commerce
Commercial Arithmetic
Commercial Geography
Composition
Conservation of Natural Resources
Consumer Economics
Domestic Science
Economics
Electricity
Elementary Science
English
English Literature
Family Living
Foods and Nutrition
French
General Office Procedure
General Science
Geography
Geology
Geometry
German
Grammar
Guidance
Handicrafts
Handwriting
Health
History
History of Art
Home Economics
Home Management and Care
Home Room Guidance
Instrumental Music
Journalism
Language Arts
Latin
Library Science
Literature
Manual Training
Mathematics
Medieval History
Modern History
Music
Occupations
Office Practices
Penmanship
Physical Education
Physics
Plane Geometry
Psychology
Public Speaking
Punctuation
Remedial Reading
Safety
Science
Secretarial Practice
Shorthand
Social Studies
Sociology
Solid Geometry
Spanish
Speech
Spelling
Typewriting
United States History
Vocational Guidance
World Geography
World History
Zoology

How to Use Motion Pictures

Select proper film. It is unfair to students to show a film merely to take up time: each presentation should have a definite teaching objective, which is usually to explain and clarify a specific lesson. The trainer-

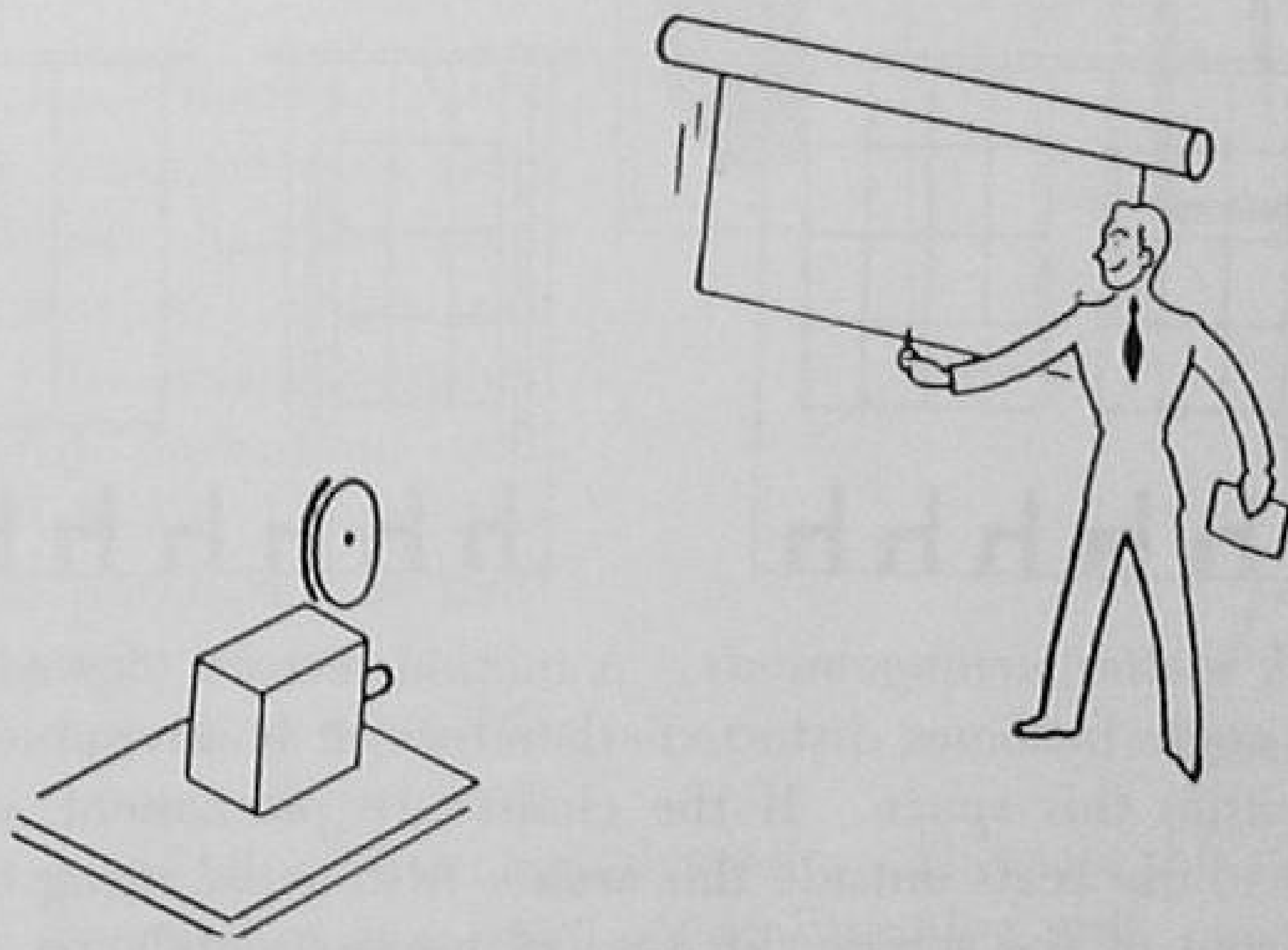
instructor should check through his lesson plan, and place the date and title of his film in an audio-visual aid column. Unless he has his own film library, he should order the film well in advance to assure delivery on time.

Check everything before showing film. Last-minute disturbances and hurried preparations do not contribute to an effective motion picture projection. These distractions can be avoided by checking the following points:

1. *Preview teaching film.* This is a MUST in order to insure proper handling of a film. For future reference, it is also advisable to note briefly contents of the motion picture on file cards, including title, running time, type, and source. After the initial preview, it will be necessary only to check the file before showing the film.

The instructor's manual and film guide, which accompany educational films, usually give reviews of the content, aims, scope, suggested student learning activities, evaluation techniques, and suggestions for special followup problems.

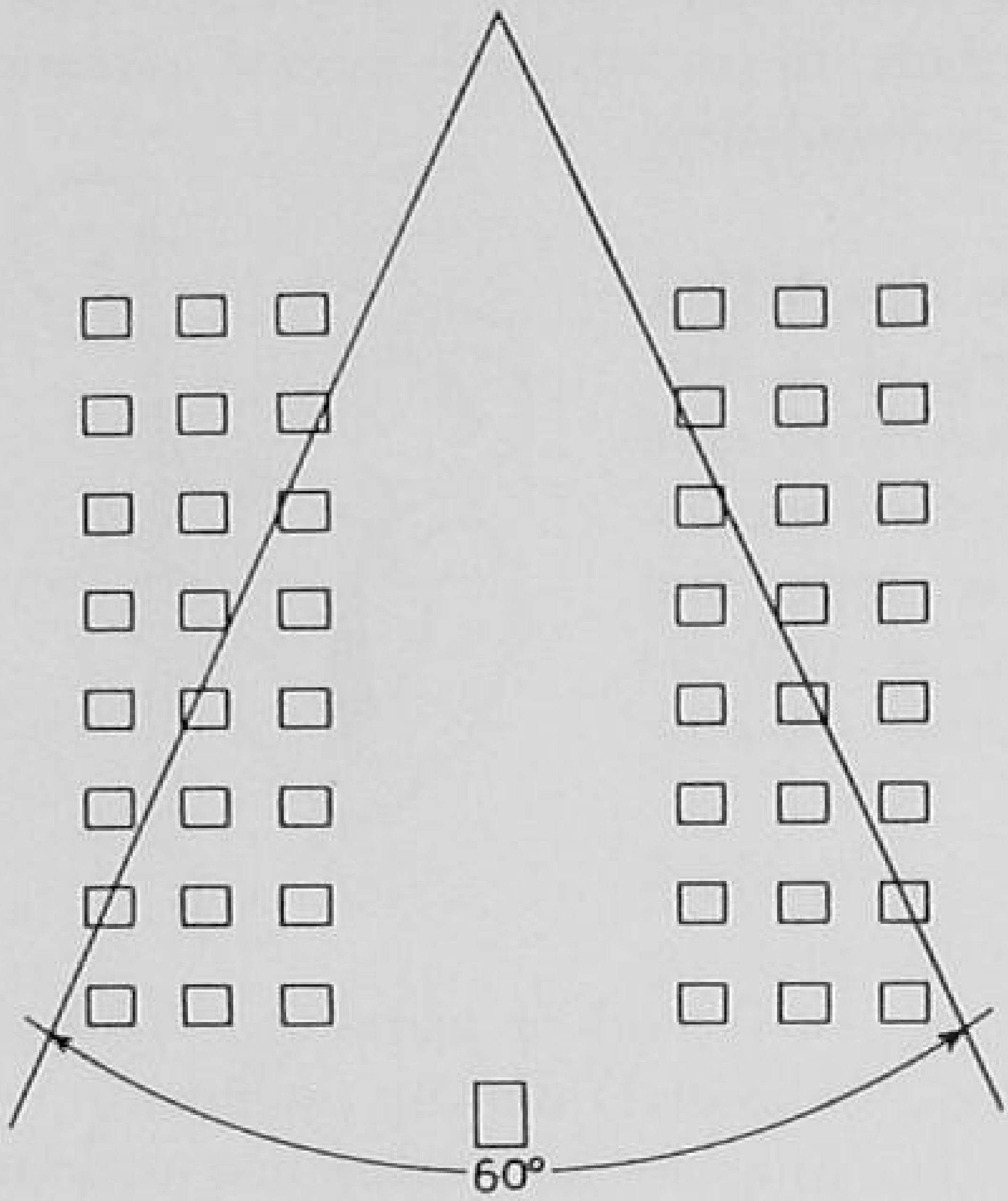
2. *Set up projector and screen.* The projector and screen in a modern classroom are either one complete unit or permanent fixtures. In most situations, however, it will be necessary to set up the projector and to focus the light on a screen. The distance between projector and screen will be determined by the number in the group, type of screen, and shape of the room.



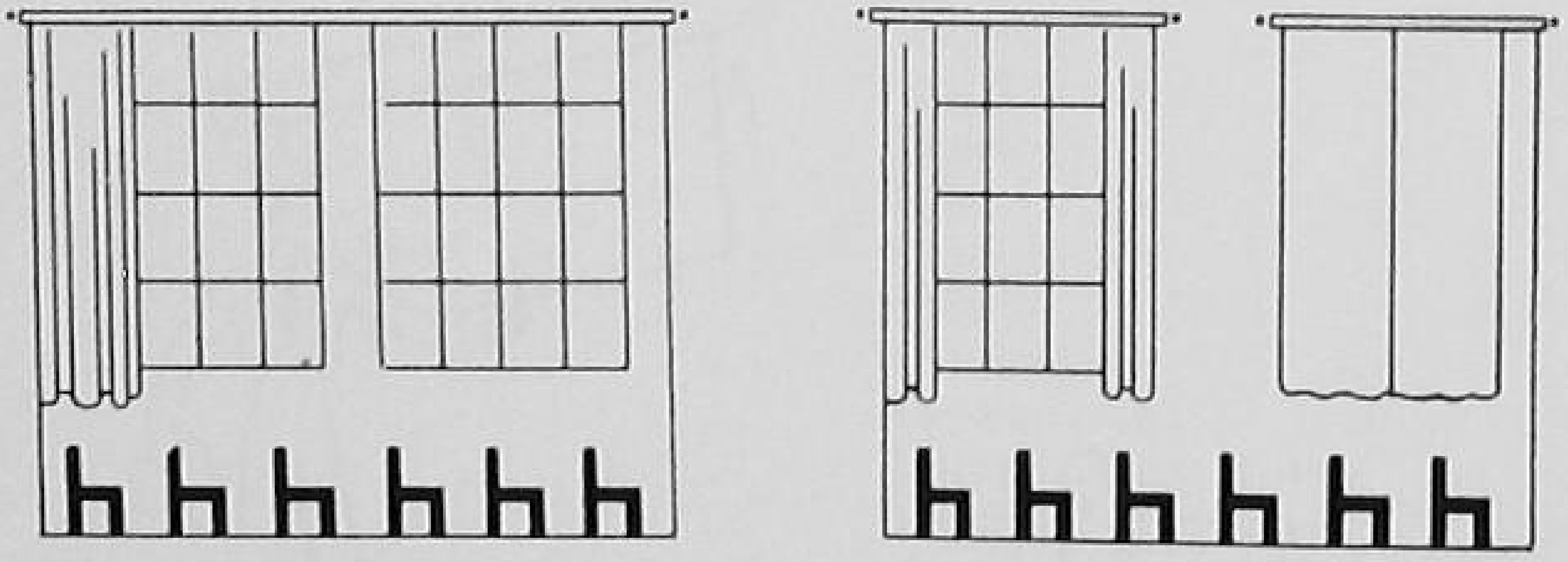
The projector should be placed on a 4-foot stand. If such a stand is not available, a table or any other steady support will serve the purpose. If using a sound film, attach the speaker to the projector and place the

speaker up front, near the screen. Best results are obtained if the speaker is kept off the floor, upon a stand or table.

A screen so placed that the bottom is approximately at the eye level of the seated trainees provides the best vision. The portable-stand type has this feature built in the mechanism. But when using the table- or roller-type screen, this point should be kept in mind. When a screen is not available, use a large sheet of white paper or light-colored fiber board. An excellent home-made screen can be made by painting a wall or any other smooth surface with three coats of flat, white paint. Flat white reflects a better image than an aluminum-painted surface.



When a projector is used in an extremely large hall or auditorium, it may be necessary to increase the size of the projector lamp, and an auxiliary telescope lens may possibly be required. In most cases, these additions can be avoided by placing the projector close enough to utilize the full space of the screen. To provide a projector support in an auditorium having stationary seats, it will be necessary to build a simple fixture to rest on two seat backs.

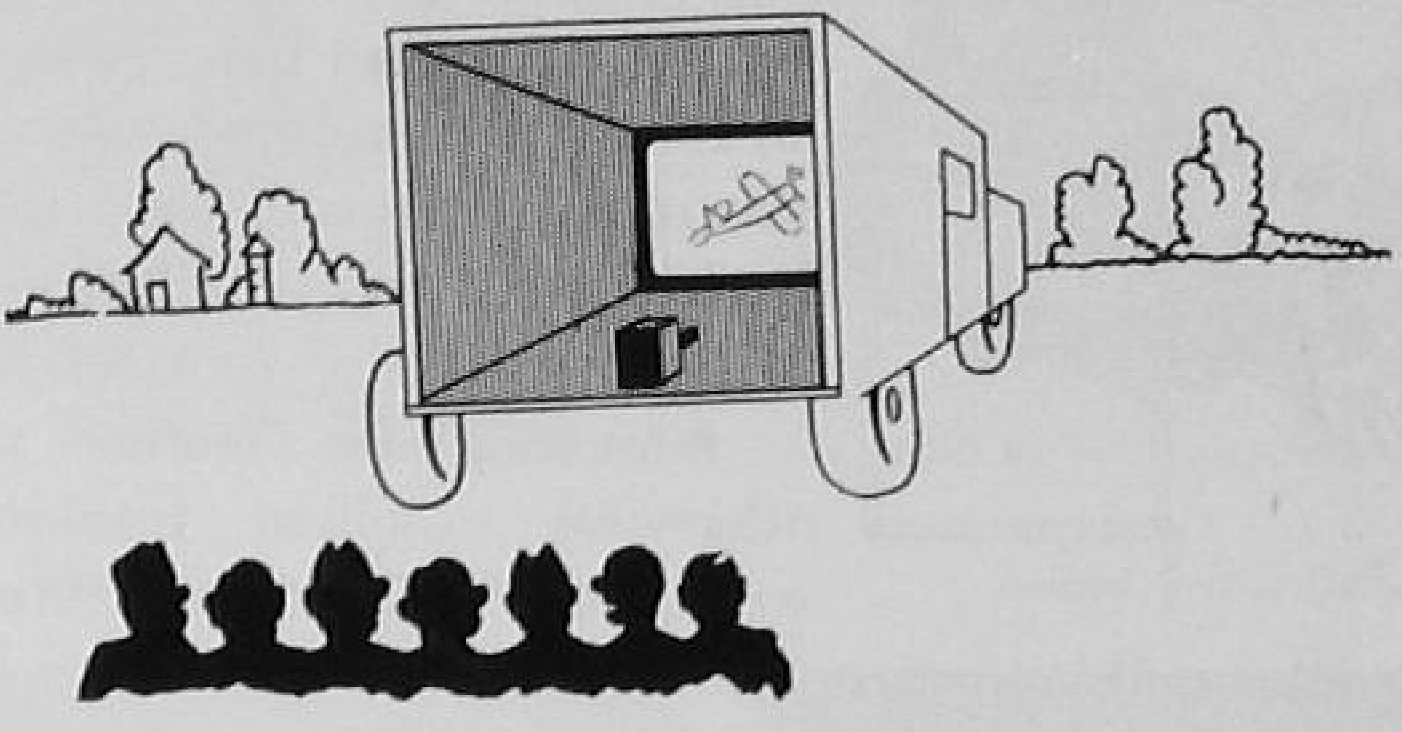


3. *Check seating arrangements.* A motion picture viewed outside of a 60-degree angle becomes distorted—therefore, it is advisable to confine all chairs within this space. If the chairs are permanent, request the students not to use seats outside this area. Also avoid using those chairs directly in front of the screen: an area of approximately six feet should be left vacant.

4. *Check lighting.* Unless you are using a single projector-screen unit or a shadow box, it is advisable to darken the room. If the situation

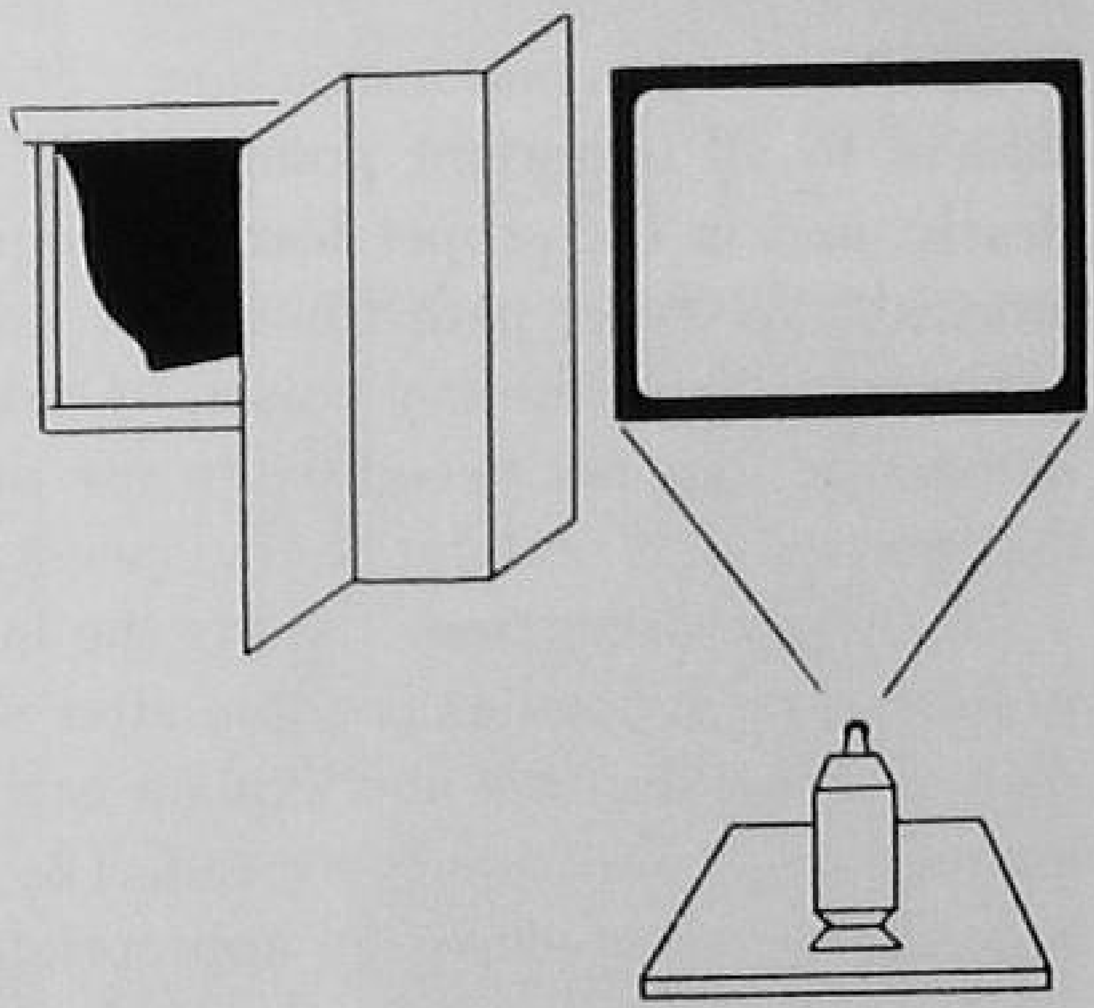
requires the student to take special notes on the film, use the room lights instead of raising the window shades. Prevent light rays from shining directly on the student's face.

If the classroom is not equipped with opaque shades, outside light may easily be excluded by using a simple home-made shade of inexpen-



sive canvas or duck material. Opaque drapery material would be adequate, and would add to the attractiveness of the room. Windows spaced close together could be covered by drawing a single shade across the entire wall. Windows with large areas of wall space between them could be adequately darkened by hanging the material on individual curtain rods.

Outdoor meetings in the school yard or on a country field may also utilize a motion picture presentation without waiting for nightfall, simply by placing the screen in a suitable shaded area. The inside of a covered truck would be excellent.



5. *Check ventilation.* A hot, stuffy, dark room induces sleep and drowsiness. Sacrifice complete darkness to avoid poor ventilation. In warm weather, use cardboard "dark room" ventilators, which are inexpensive and may be purchased at most local photography stores.

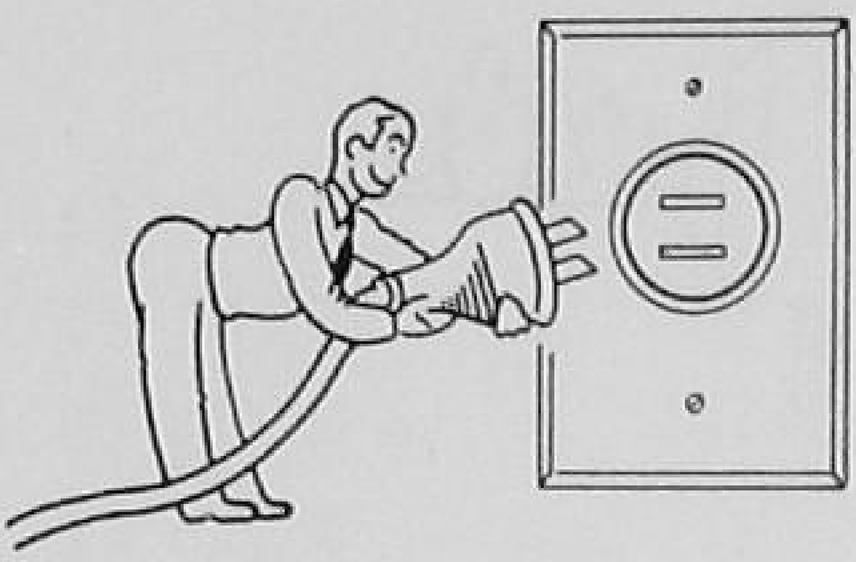
Room temperature over 72° or humidity above 50 per cent dulls alertness and affects learning adversely. Alleviate this situation with an ordinary electric fan or a small air-conditioning unit.

6. *Test projector.* Know your projector before attempting to use it. Films and projectors are expensive, extremely sensitive, and require special handling. Fumbling with a projector will prevent giving a

smooth performance. Therefore, learn how to operate the machine before using it in the classroom.

Check the electric outlet for current when the room lights are turned off.

Insert film in projector and focus the image or title on the screen. Check the image for sharpness and centering. If necessary, rethread the projector and have everything ready so that it is merely necessary to turn off the room lights and start the projector.



The stage is set and the class is about to begin. Follow your lesson plan.

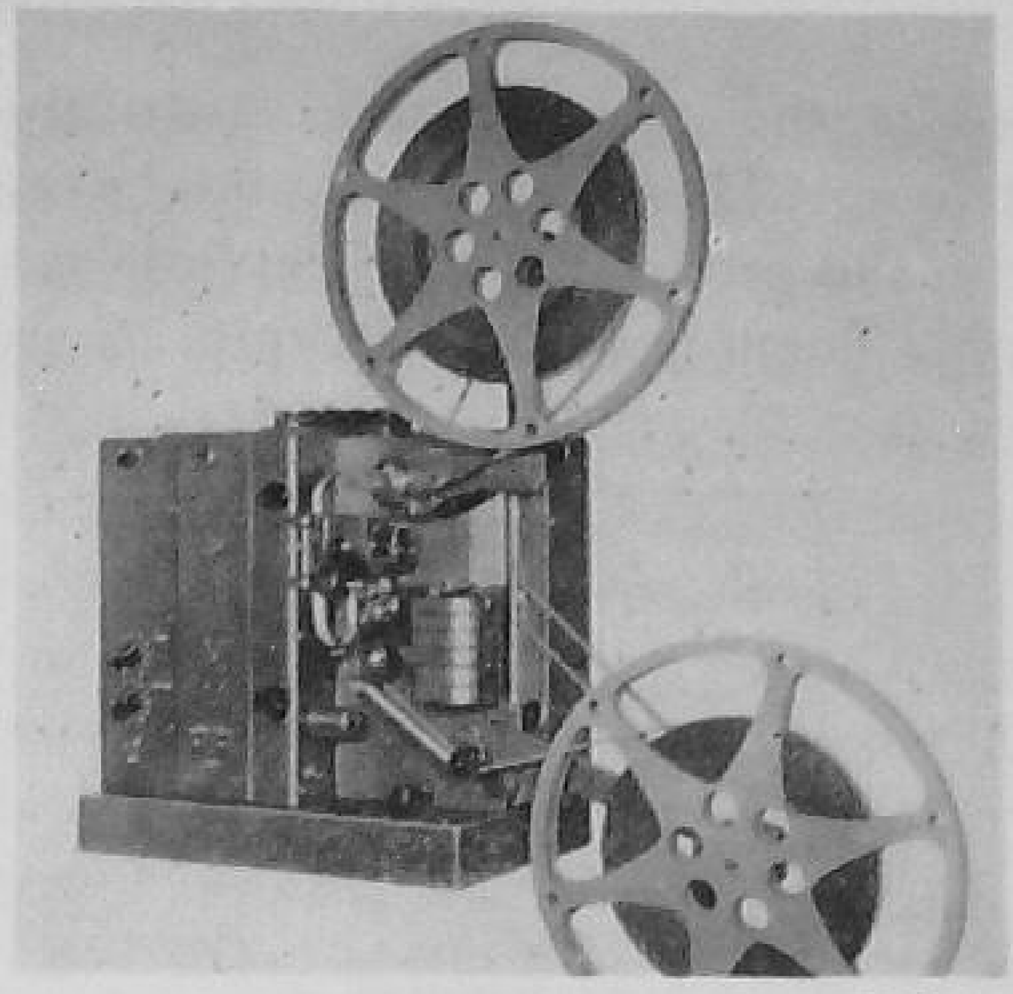
Presenting the motion picture. An otherwise excellent teaching film is worthless if it is not presented properly. A good instructor will lay a strong foundation for instruction by arousing the enthusiasm of the student and by presenting the film at the right moment. The following procedure will assure success.

1. *Prepare student.* Use the problem-solving approach when possible. Put the class at ease with a few carefully planned remarks. Then, in a simple, clear-cut manner identify the problem that is to be solved. Tell why the film is being shown, and above all, show the student how he will benefit by it. If the student realizes that his knowledge will be tested at the completion of the problem, usually his interest will become more acute, his keenness of observation greater, and his ability to learn more effective.

2. *Present film and instruction.* Step by step, call the attention of the student to all important points in the film. Present each step briefly, clearly, and in the proper learning sequence. Your presentation should proceed in a direct path from what the student knows to what he does not know. Show the key points. Darken the room and project the film. Remember it is not necessary to use an entire teaching film. Use only that portion that pertains to the specific problem.

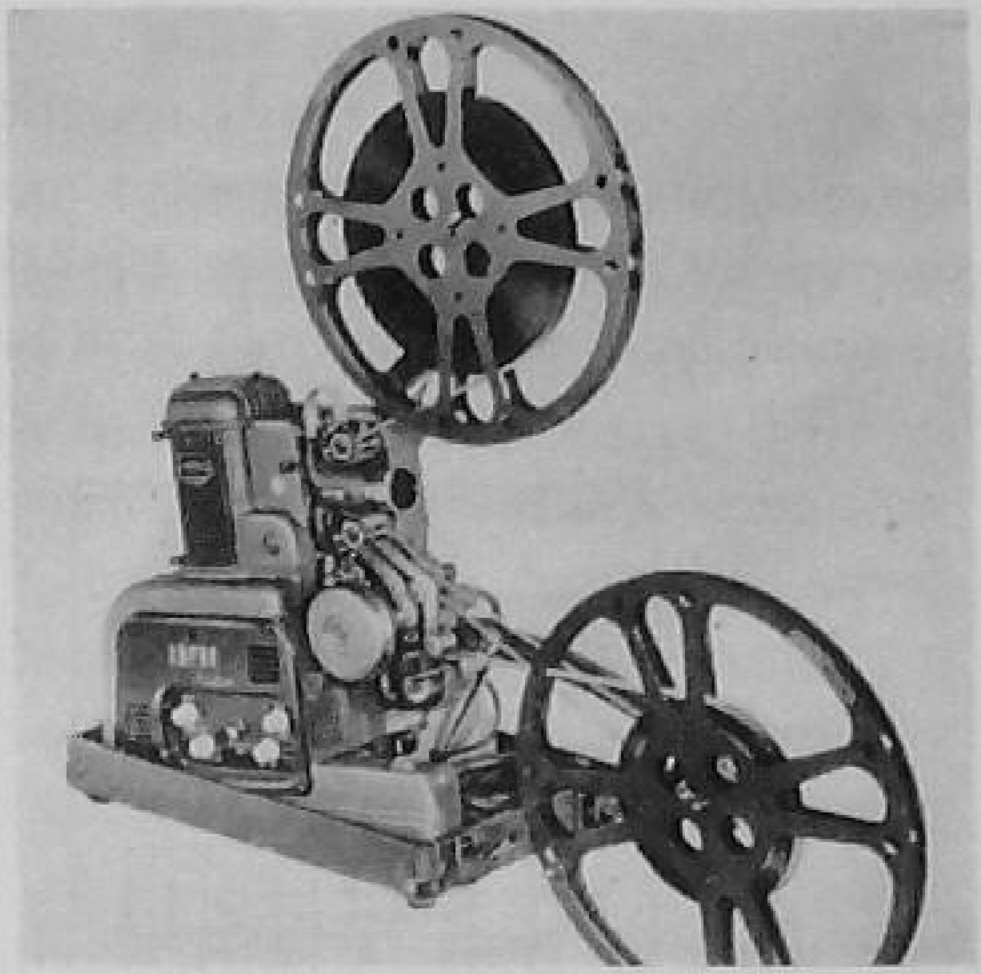
3. *Apply instruction.* Apply the information immediately to specific problems, or as soon as possible after showing the film. Have each student perform the task and explain each step. In all three categories of instruction—(1) manipulative skill, (2) factual information, and (3) attitude development—insist on appropriate terminology and correct timing.

4. *Test students.* Can the students perform the job? Can they apply the new information, or use the new attitude? This is the only real test for effective teaching. In other words, "They can or they can't." If the lesson is a manipulative skill, test the students for performance and speed. If it is attitude development or factual information, use a simple test or quiz card. The quiz card shown in the illustration is very effec-



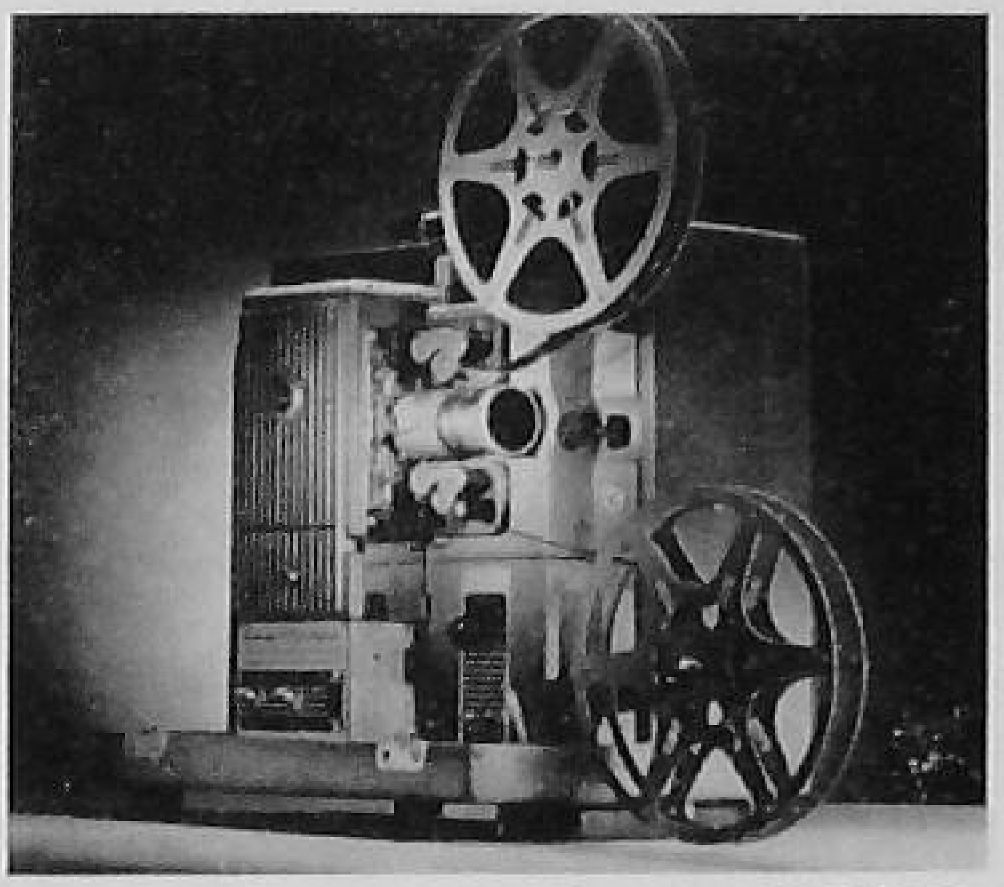
R.C.A.

RCA "400"—Senior Projector.



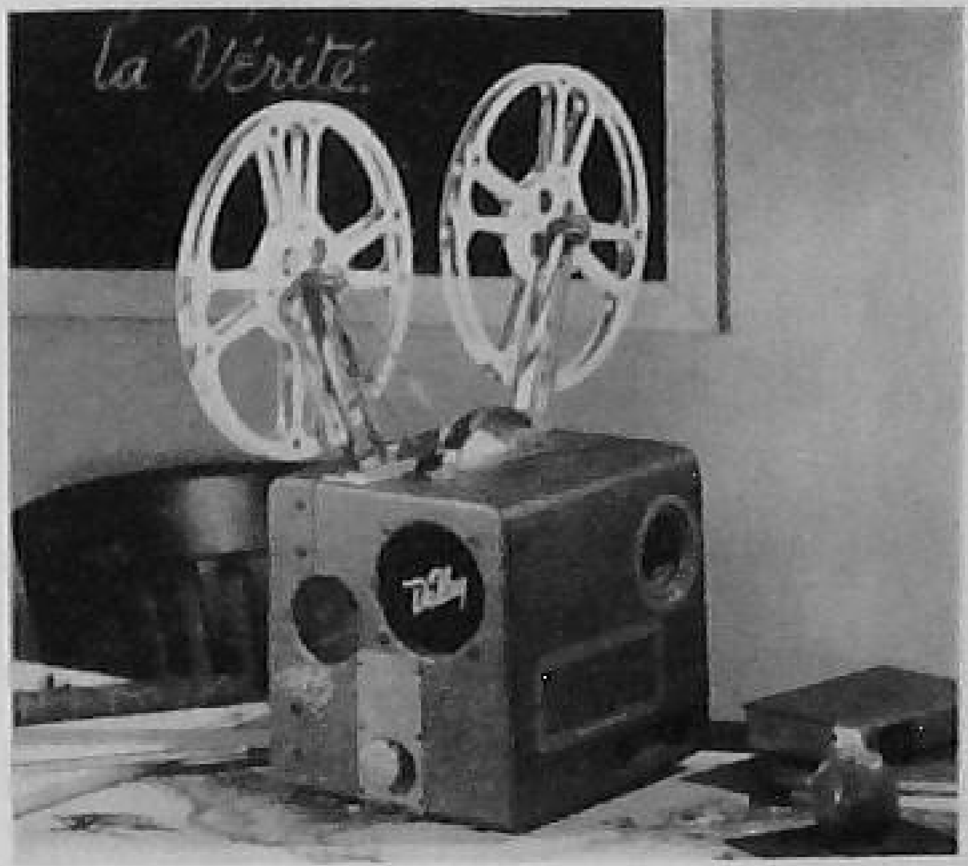
Ampro Corp.

Ampro Stylist Deluxe.



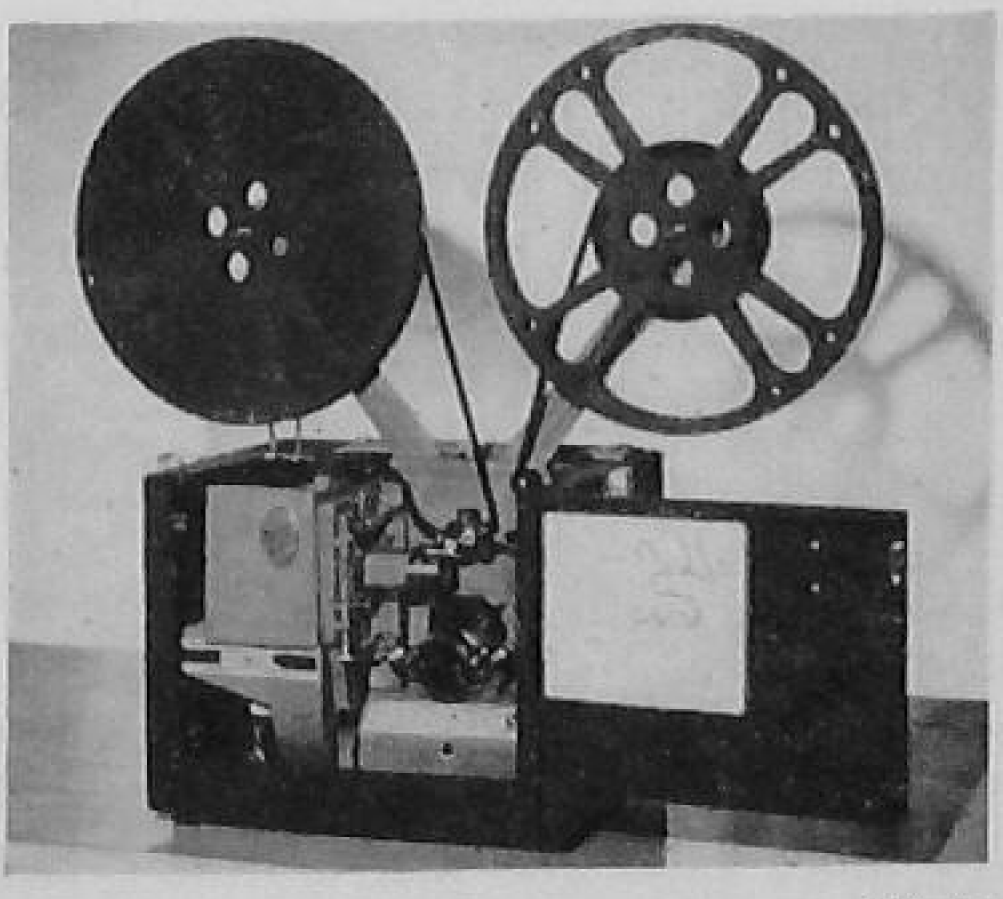
Eastman Kodak Co.

Kodascope Royal Projector.



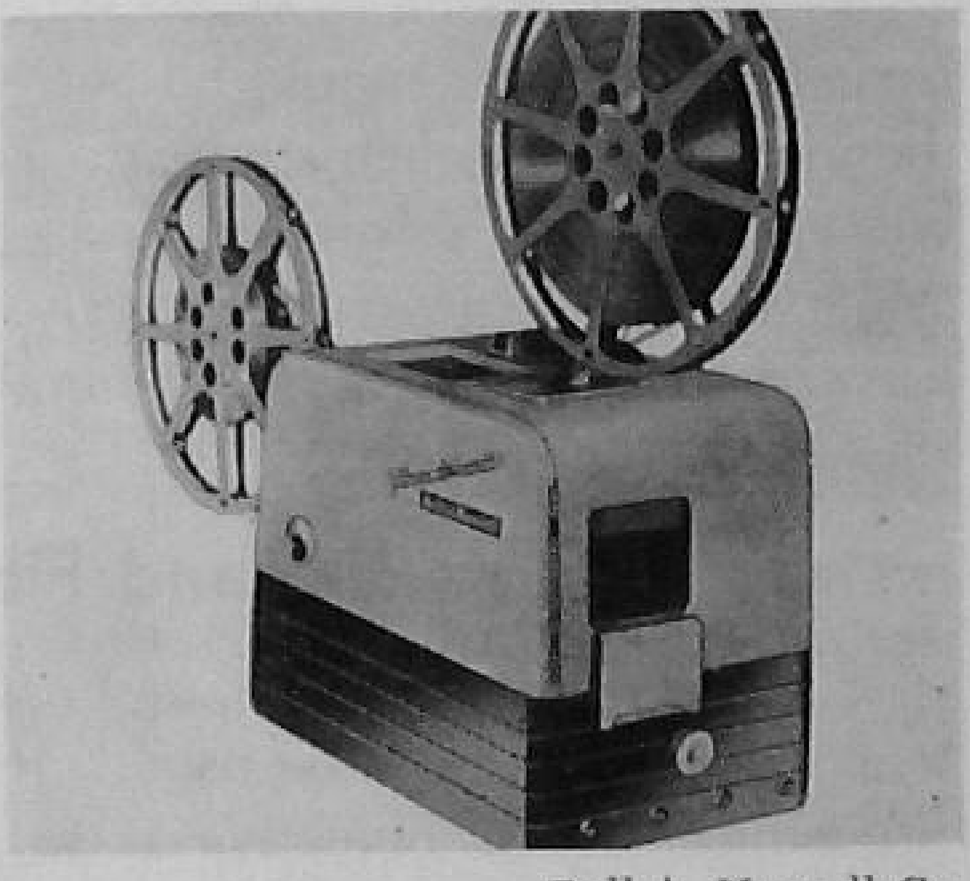
Technical Service, Inc.

DeVrylite "5."



Victor

Victor Sovereign Projector.

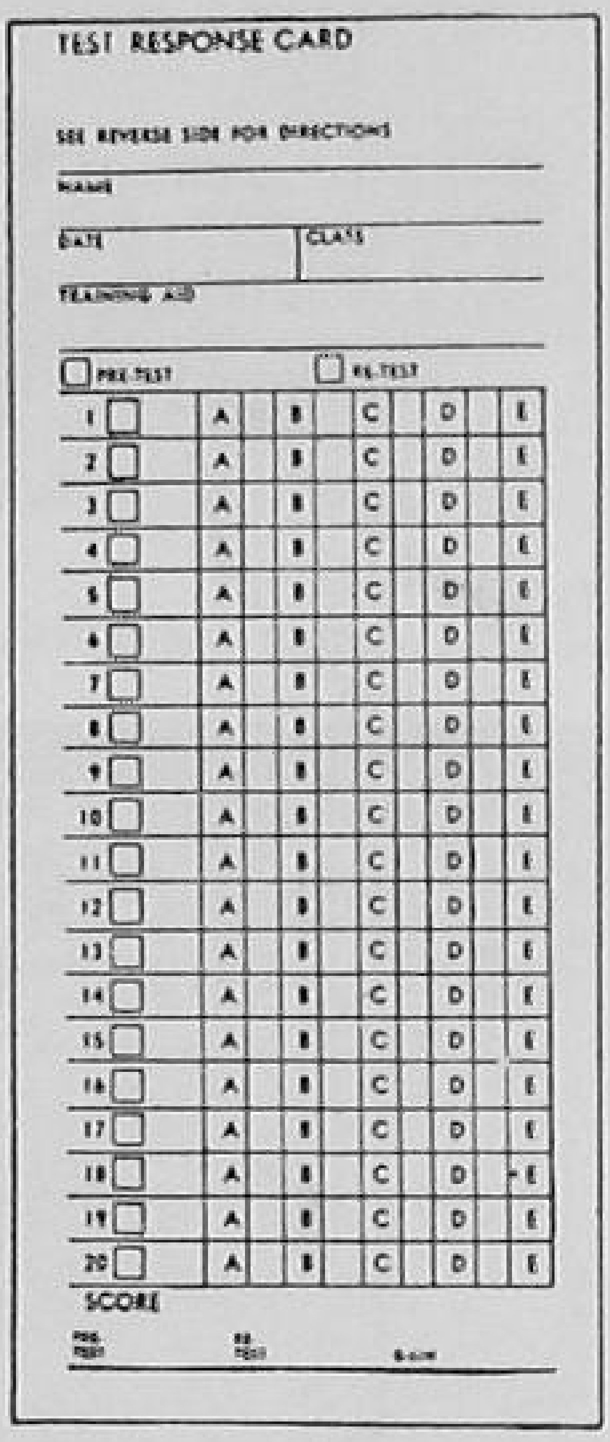


Bell & Howell Co.

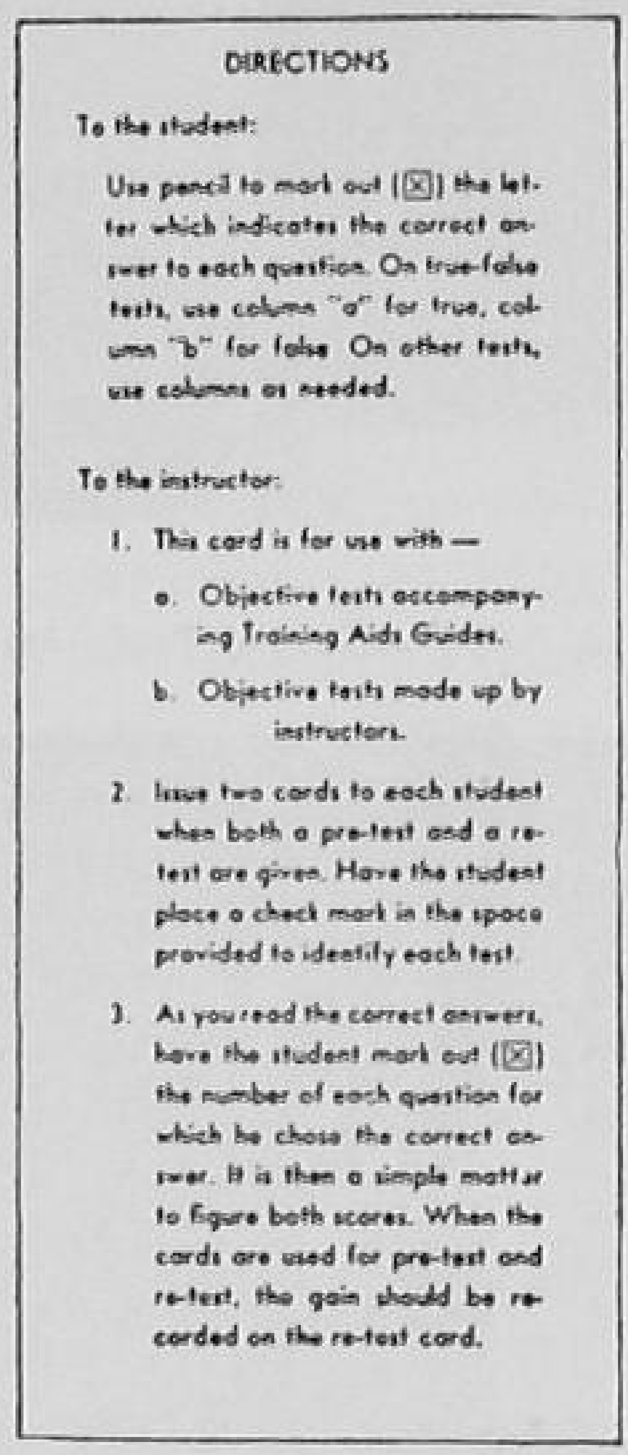
Bell & Howell Filmosound—Specialist.

Some of the popular motion picture projectors used in schools, churches, industrial plants and business firms.

tive. The instructor reads questions of the objective type: true-false, completion, multiple choice, or matching. These questions may be answered by putting a hole or a mark in the proper space. The hole may be made by a pencil, a match, a nail, a finger-nail file, a hairpin, or any



(Front)



(Back)

other convenient object. The cards may be scored by the learner himself or students may exchange cards and score them.

5. *Review lesson.* All weaknesses, errors, or misunderstandings revealed by the quiz should be corrected immediately. Patiently restrain the impatience of each student. Reshow the film or part of the film that will clear up any misunderstandings. The final test is: Do the students understand the lesson correctly? Remember, *if the student hasn't learned—the instructor hasn't taught.*

Instructor's Manual and Film Guide

Each class, each lesson, and each situation will determine the specific teaching technique to be used. If necessary, deviate from the suggested procedure. Your objective is to give more effective instruction. The student is the most important factor to be considered. Instructor's manuals and guide sheets, which often accompany films, are very helpful in determining procedure. Student-teacher planning guides have also

been used with much success. These guides are developed cooperatively by student and teacher. They appear to facilitate learning in the classroom by arousing student interest, encouraging group participation, sharing ideas and responsibilities, and providing meaningful experiences.

Educational film producers and distributors such as Coronet Instructional Films, Encyclopaedia Britannica Films, Motion Picture Associations of America, Inc., and Teaching Film Custodians, Inc., have developed some excellent teacher guides to accompany their films. For example, a film guide which accompanies the Encyclopaedia Britannica film *The Basic Elements of Production* provides the instructor with the following helpful information:

1. *"Story of the Film."* The topic dealt with, the level of instruction for which the film is intended, and courses in which the film can appropriately be used, along with a detailed summary of the content of the film.
2. *"Before Showing."* Suggestions for things the teacher should ask the class to look for in the film, and a list of terms with which the class should become familiar.
3. *"After Showing."* Activities and subjects for discussion.
4. *"Related Films."* Titles of films from the same source dealing with similar topics.

How to Operate Motion Picture Projectors

Types of projectors. There are several types of silent and sound projectors that are suitable for use in the classroom. The basic principles of projection are similar in all types; however, each projector is somewhat different from the others.

To get smooth performance check the following points:

Silent film

1. Follow the instructions that accompany the projector. If these directions cannot be located, request the manufacturer to send new ones. Be sure to state model number of the machine.
2. Use alternating current. If only direct current is available, check instructions.
3. Place projector so that a satisfactory image is obtained on the screen.
4. Examine threading chart before putting film into projector. Most machines require top and bottom film loops at the film gate for satisfactory performance.
5. After threading film in projector, test its operation with the hand before turning on motor. Remember, if your projector requires the two loops, they must be maintained.
6. Frame picture on screen.
7. Bring image to sharp focus by adjusting lens.

8. Set projector for "silent" or "sound."

9. Rethread machine to the first title before presenting it to the group.

10. Stop projector as soon as the last picture appears, and remove the film from the projector after the group is dismissed.

Sound film. If you are using a sound training film, you must also check the following items:

1. Unless the speaker and projector form one single unit, the cable must be plugged into the amplifier outlet.
2. Locate the speaker near the screen, and off the floor. Check the sound system.
3. The amplifier should be warmed up several minutes before projection is started.
4. Turn up volume after starting picture. Too much volume impairs hearing.
5. Adjust tone control to obtain clear sound.
6. Turn down volume before stopping picture.

Courtesy Collescope Co., Milwaukee.

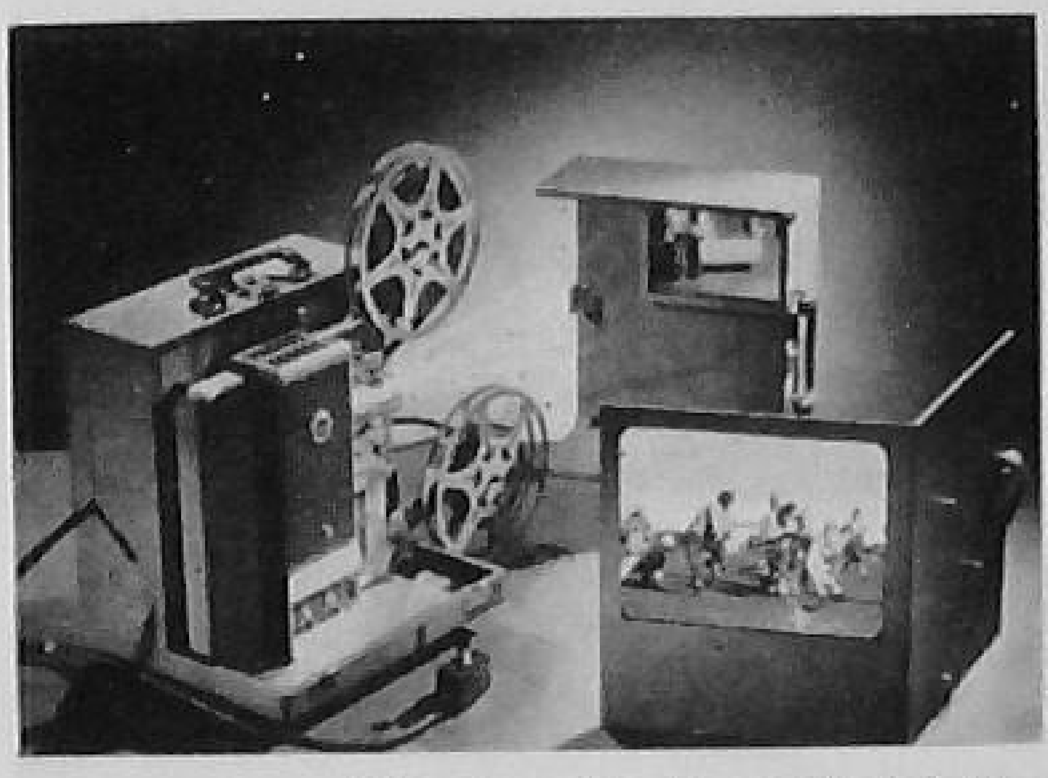
Using a rear projection film unit with a motion picture projector in a semi-darkened room.

Rear and "specialized" projection. Rear projection is made possible by the use of a translucent screen. The projector is placed behind the

screen and the projected image appears on the front of the screen. This type of projection is extremely helpful when it is impossible or undesirable to darken a classroom. Very little space is required between the projector and screen.

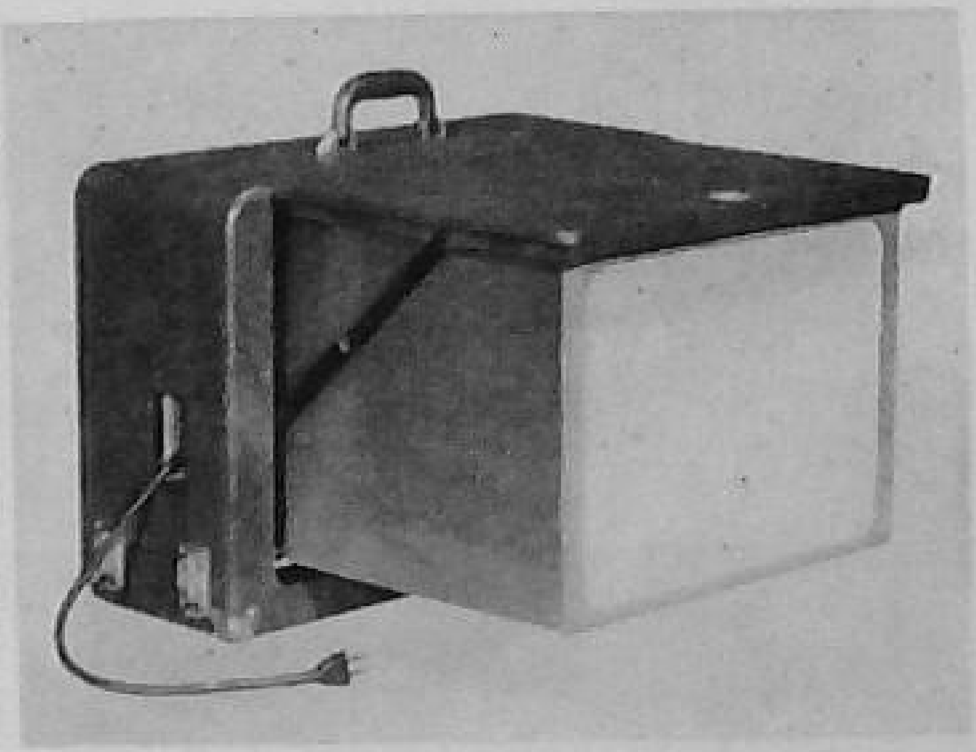
Compact, portable units for silent and sound films, such as the Sono-Vision, Automotion, and TSI Suitcase Projectors, contain both screen and projector and are convenient to use. The instructor merely inserts the film in the conventional manner and starts the projector. The picture then becomes automatically focused and framed on the screen.

Other types of projectors such as the Ampro self-contained 16mm. sound projector-repeater and the Kodascope Analyst Projector are being produced by alert manufacturers to meet specific instructional needs.



Courtesy Eastman Kodak Co.

Kodascope Analyst Projector.



Courtesy of Ampro Corp.

Ampro Self-Contained 16MM Sound Projector—Repeater.

Caring for the projector

1. Keep your machine clean, especially the film gate track. Neglect interferes with good performance and harms the film.

2. Oil the machine according to directions. Improper lubrication causes excessive wear and interferes with operation.

3. Spare lamps. To avoid being left in the dark, have a spare projector lamp and exciter lamp on hand at all times.

4. Replacement parts. It is also advisable to have a replacement belt, electric plugs, and sufficient extension cord, especially if your projector is of the portable type.

Miscellaneous hints. Silent film may be used in a sound projector, but it is impossible to use sound film in a silent projector. A standard reel of silent film carries 400 feet of film, and the showing time is approximately 15 minutes. A similar-sized reel of sound film requires approximately 10 minutes showing time. Silent film is projected at the rate of 16 frames per second and sound film projects at the rate of 24 frames per

second. In order to save time or to "liven up" a silent film presentation, the projector may be operated at sound speed. But this should not be attempted where "timing" is an essential part of the film feature.

The majority of 16 mm. film is projected with the dull side facing the screen, and the pictures are inverted as they pass through the projector. Color films and prints made from reversal film are projected with the dull side in and the shiny surface facing the screen.

When a "still" is desired while the film is in motion, it is usually necessary to focus the lens, after stopping the machine. Refocus lens when the projector is started again.

School-Made Motion Pictures

Producing a motion picture is an educational project of unusual and diversified value. Consider, for example, the case of the high school in which a large number of pupils participated in producing a film telling the story of their city's water and waste disposal systems.

In conducting the preliminary research, in preparing the scenario, in filming the scenes, and in editing and titling the production, the students

Courtesy of Mills Industries, Inc.

Combining the projector, screen, and speaker in one portable unit.

Courtesy of Bell and Howell Co.

Planning a school-made motion picture, writing the scenario, and producing the film are excellent educational projects.

who took part learned more, their teachers believe, than they would have assimilated through months of reading and classroom discussion. These pupils acquired, with great enthusiasm, an excellent understanding of local government and its functions; at the same time, civic authorities developed a new appreciation of the type of learning carried on in this progressive school.

In addition to learning by doing, the pupils provided the school with a film from which future classes can learn much. An ideal literary project is *Film production by pupils teaches lessons in expression.* It is an invaluable course in business organization and conduct. It demonstrates the advantages of cooperation, of working together, each doing a definite part to achieve a goal. It also creates a degree of interest that few other projects can match.

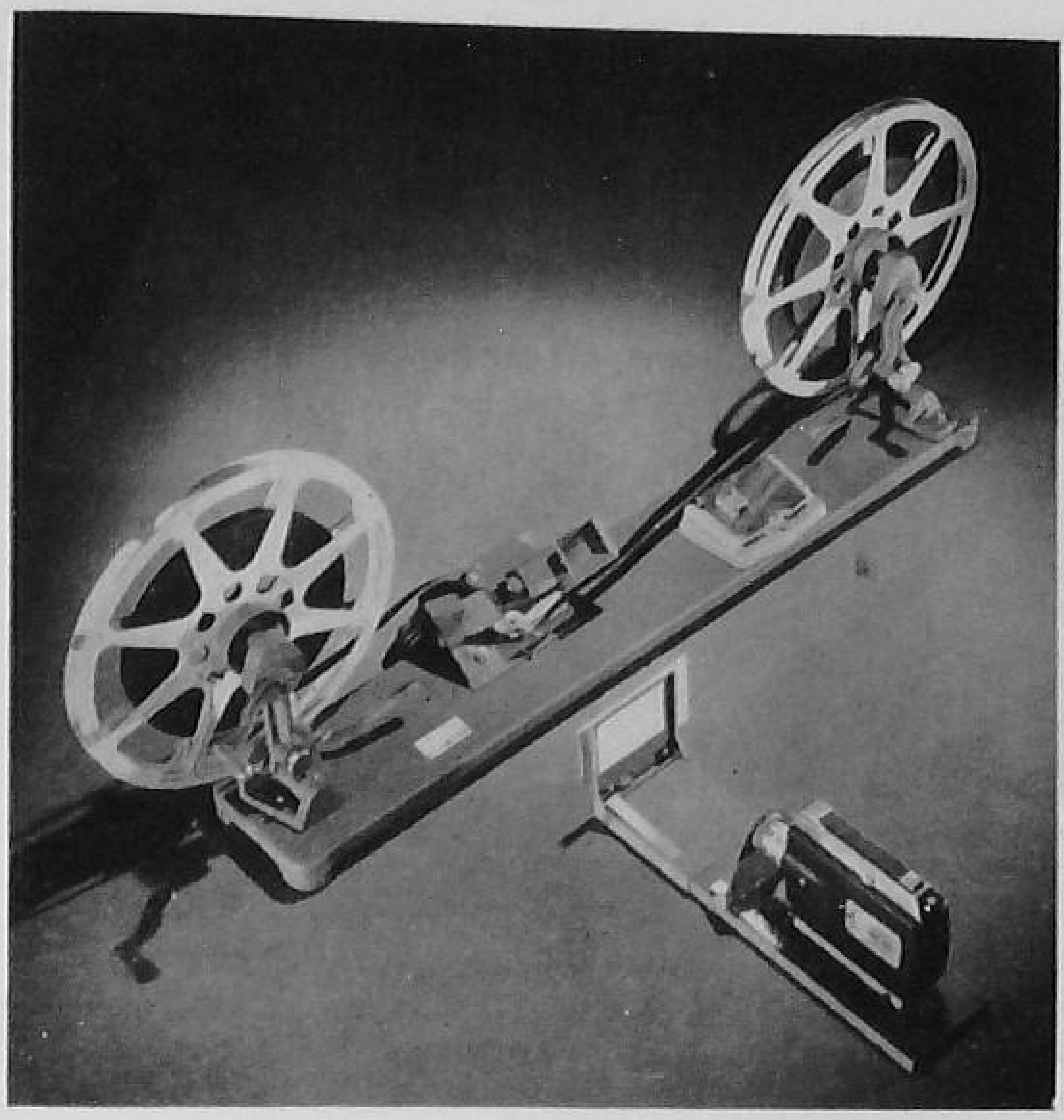
Planning the school-made film. Planning a school-made motion picture involves certain procedures that should be observed carefully. First, the requirements and purpose of the film should be thoroughly and clearly established. This will save many hours of production time and avoid later changes in plans.

The next step is to prepare the outline or scenario. This should be done in full detail before the first foot of film is shot. Otherwise it will be found later that certain scenes do not fit, and that still others are needed to complete the picture. In preparing the scenario, scenes should be selected entirely because of their relation to the ultimate purpose of the production.

If the film is to tell a story to be used in advanced science classes, all the scenes and comments should be both scientific and accurate. If the film is intended for a juvenile group, keep the story within the understanding of juveniles. If the film is one designed to demonstrate to the public some of the achievements of the school or school system, it should include those activities which will be of greatest interest to the probable audience, the pupils' fathers and mothers.

Equipment needed. The requirements of the proposed film will determine largely the type of equipment needed to photograph it. In order that the picture may be shown on the school projector, it should be made on 16 mm. film. If certain scenes must be slowed down or speeded up for clarity, a camera that provides higher and lower than normal speeds will be needed. If special-purpose lenses are to be used, a camera with a turret head will be a convenience. Your local audio-visual dealer can be of considerable assistance in recommending the camera best suited to your production plans.

The selection of appropriate film stock is not difficult inasmuch as it will be determined largely by the types of scenes to be photographed. Interior scenes will require special lighting and film designed to produce



Courtesy Eastman Kodak Co.

Cine-Kodak Titler and Master Editing Rewind and Cine-Kodak Duo-Splicer.

best results with artificial illumination. If the scenes are all outdoor, any of the standard films, either in black and white or in color, will be satisfactory.

Suggestions for making home-made films. The following suggestions [1] will be helpful in preparing home-made film:

Selecting the subject. One of the first questions to ask is whether or not motion is necessary. If not, a good slide might serve the purpose better. Next, it will be well to ascertain whether or not such a subject has been produced. If the subject has been produced somewhere else, professionally, it would be better and cheaper to purchase a print of that subject. The next problem will be to determine whether or not the various scenes required for the production are accessible to the camera. The subject should have a real purpose and that purpose should be defined clearly before production is started.

Preparation of outline or "scenario." It is essential that a plan of production be determined. Much film will be wasted if scenes are shot without relation to the plan of the picture, and much additional time will be required to fit these random shots into the production. After selecting the subject, therefore, the next essential is that of outlining, definitely, the content of the picture. Scenes selected must have a direct relation to the central purpose of the production.

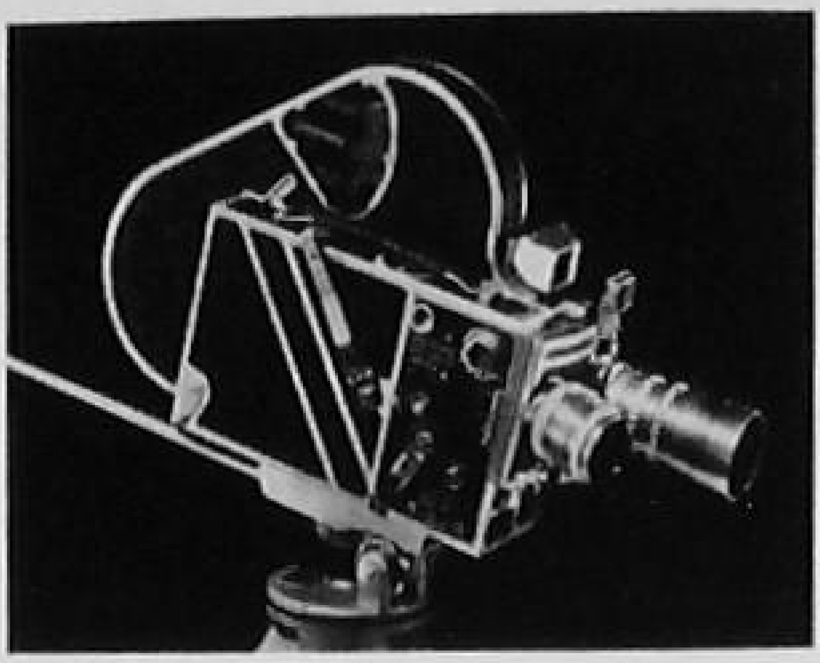
[1] Dent, Ellsworth C., *Audio-Visual Handbook.* Chicago, Ill.: Society for Visual Education, Inc.

Once the required scenes have been determined, they should be arranged in logical sequence, and the production viewed as a whole. If it is then found to be satisfactory, the plan can be turned over to the person with the camera, for the shooting of the picture.

Cine-Kodak Royal Magazine camera

Eastman Kodak Co.

Cine-Kodak Special II camera



Eastman Kodak Co.

Bell & Howell 70-DL

Eastman Kodak Co.

Popular models of 16MM motion picture cameras.

Selecting a suitable camera. The choice of a camera for this type of production will be determined by the material to be produced. If all the material planned is to be photographed in normal action, almost any of the inexpensive motion picture cameras will be satisfactory. As variations become necessary, the need for care in selecting the equipment is increased. If slow-motion pictures are contemplated, a camera with variable speeds is essential. If subjects are to be photographed at long range, lenses of different focal lengths will be needed. If interior pictures are to be taken, it may be necessary to use lenses with greater speed than ordinary lenses.

Good cameras will range in price from $60.00 upward, with the average all-purpose camera ranging in price from $150.00 to $400.00 with a complete assortment of lenses and accessories.[2]

Selecting film stock. The selection of film to be used for any given problem should be given some consideration. The ordinary negative stock should be used for those pictures which are to be used for several prints. The majority of the amateur producers, however, will not have need for additional prints and will find the reversible film to be more economical. Prints can be made from the reversible film, and the process is reasonably satisfactory. The reversible film, as the name suggests, is converted from negative to positive in the processing, and comes back to the photographer ready for projection.

The reversible film is divided into three principal classifications: orthochromatic, panchromatic, and super-sensitive panchromatic. The first is being replaced by "Verichrome" and "Plenachrome" film, which are satisfactory for all general purposes. The panchromatic film is used extensively for pictures where reasonably good light is available for the exposure. The super-sensitive film should be used in poor light or for pictures under artificial light, as it is much more sensitive to artificial light than is either regular or panchromatic film.

There are natural color films available, which add much to the value of those subjects in which color is important. The color films are a little more

[2] Refer to Appendix 2 for list of camera manufacturers.

expensive than films for photographing in black and white and may not be duplicated so easily. The proper projection of color film requires stronger illumination than is necessary for projecting ordinary film, but the new projectors with 1000- and 1200-watt lamps project color well even in large rooms. It is seldom desirable to combine ordinary and color film in the same subject.

"Shooting" the picture. After the scenario has been arranged and the equipment and film selected, the important task is that of taking the scenes to be included. There are a few simple rules to be followed that will be of assistance to the amateur, and these are mentioned below. Experience is a dear teacher and those who operate the cámera without first giving attention to certain simple suggestions may find that very expensive film has been wasted.

1. Use a reliable exposure meter to determine the proper lens setting. This caution cannot be overemphasized and such a meter should be used for each different situation. Light values are difficult to guess, even for the professional.

2. Keep the lenses immaculately clean. The least bit of dust or oil on the surfaces of the lenses will have a tendency to destroy the true picture. A lintless linen cloth or a piece of lens-cleaning tissue will be satisfactory for cleaning.

3. Keep the camera clean and well oiled. The very accurately machined parts of the mechanism must have ordinary care in cleaning and oiling if the best results are to be obtained. Follow the instruction book with the camera.

4. Hold the camera steady at all times. This can be accomplished only by using a sturdy tripod, which is almost as necessary as a camera if good pictures are to result. It is almost impossible to hold any motion picture camera steady in the hands and it should not be attempted except in extreme cases where it is impossible to use a tripod.

5. Make complete scenes; not bits. A simple rule to follow is to count slowly to ten for any scene, increasing the length of the scene as may be needed to complete the picture of the action to be recorded. Short exposures are unsatisfactory and will waste much film.

6. Shoot action shots at an angle. Pictures of rapid action should be photographed at an angle of approximately 30 degrees, with the action moving toward the camera. Pictures taken at right angles or directly behind or in front of the action are usually unsatisfactory.

7. Use filters whenever possible. A filter will tend to give a more nearly true recording of color gradations and will result in smoothness of detail that is not possible without a filter.

8. Do not "pan" the camera. It is best to set the camera in a stationary manner and let the action move through the field of the lens. Turning the camera from one point to another while the picture is being taken, except at very high speeds, will produce a jerky result.

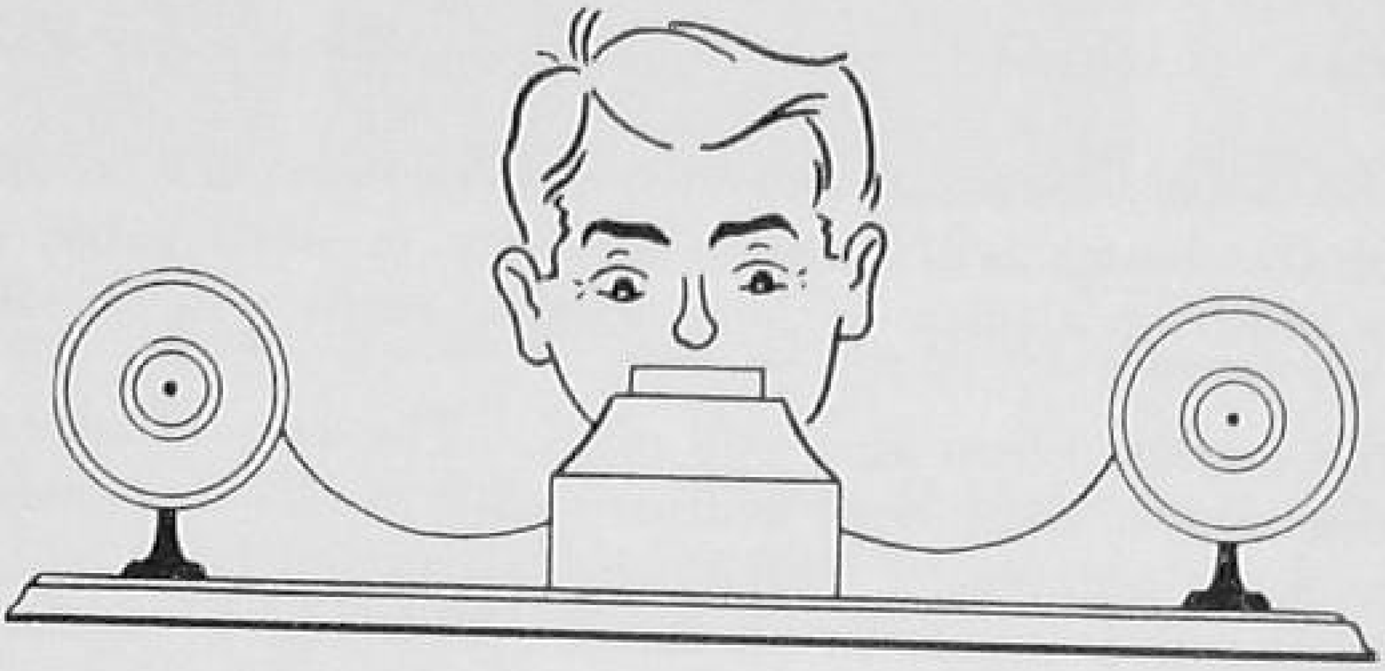
9. Use half-speed or slow-motion variations only when necessary. If it is desirable to slow down the action of the subject, pictures may be taken at 32 or 64 frames per second. Football pictures seem to be best at 32 frames per second, as normal action is too rapid for careful study of the plays. The half-speed pictures have but a minor place in a film, except for variety.

Editing the film. After the films have been exposed and processed, it will be necessary to "edit" them. The scenes will be joined together without titles and it will be necessary to insert proper explanatory titles ahead of each scene. The following suggestions may be of assistance:

1. *Cut out all inferior scenes.* If some of the exposures have not been entirely satisfactory, throw them away and retake them, rather than spoil a good film by leaving them in it.

2. *Use attractive titles.* Cheap and irregular titles will spoil an otherwise satisfactory subject. Titles can be made, but it is usually more satisfactory to have them prepared by an experienced title maker. Furthermore, a good title maker will be able to make suggestions as to the most attractive way to arrange the titles. There are several organizations that will prepare the titles at the usual commercial rates—25 to 45 cents for ten words or less—and will assist with the editing at a nominal additional charge.

3. *Splice the film carefully.* Good splices are essential if the film is to operate smoothly in the projector. Follow the instructions that accompany any good splicing outfit.



4. *Do not show the film until edited.* The desired effect of many amateur productions has been jeopardized by showing the pictures before they have been titled and edited. An unedited picture is almost certain to leave a poor impression.

5. *If the picture is to be used extensively,* have a "dupe" negative prepared from which additional prints may be made, and save the original. If it is not to be used more than forty or fifty times, the duplicate print will not be necessary.

For more information on the actual production of instructor-student-made films, refer to *How to Make Good Movies.*[3] It discusses the subject of home-made movie-making from all angles in a nontechnical manner.

Adding sound to home-made films. After a home-made film is prepared, adding music, commentary, or any other type of sound, by means of a magnetic sound projector, is now a relatively simple matter. By means of such a device, the instructor or student can record and listen to his own recording within a few minutes. This method of recording eliminates costly studio facilities, expensive equipment, and the waiting time for optical film processing. The recording is made directly on inexpensive magnetically striped film and can be played back, erased, or

[3] Eastman Kodak Company, Rochester, N. Y. May be purchased at most local photography stores.

re-recorded by the flick of a switch. The cost of adding magnetic striping to film is, comparatively, so low that it permits magnetic recording at a fraction of the cost of optical or standard recording.

Courtesy Radio Corp. of America

Mixing voice and music using the RCA "400" Magnetic Recorder Projector.

The following simple directions for adding sound to your home-made films accompany the RCA Magnetic Recorder Projector.

1. Add magnetic iron oxide stripe to your 16mm single perforated film (if your film is double perforated, a single perforated duplicate print should be made).
2. Project film on the RCA Magnetic Recorder Projector.
3. Record as you watch projected picture—you turn the selector switch to the "record" position and talk into a microphone or record music from records or radio.
4. Play back immediately. To listen to the recording you've just made—to check on a particular passage, activate another control and the machine plays back immediately.
5. Erase and re-record. If revision is necessary, rotate the selector switch to the "erase" position and obliterate instantly the passage requiring revision, then re-record. Safeguards on the RCA Magnetic Recorder Projector prevent accidental erasure.

Examples of Home-Made Classroom Films

Many school activities lend themselves to motion pictures. A few examples of home-made films are listed. Many others may be found in a compilation prepared by *Educational Screen.* Write directly to the Editor, School-Made Picture Department for information concerning this list. In most cases the school is willing to supply further information concerning its films.

School Activities, Addison Junior High School, Cleveland, Ohio.

The Social and Military Life of George Washington in Morristown, Alfred Vail School, Morris Plains, N. J.

Co-ops at Work (portrays cooperative work and study), Antioch College, Yellow Springs, Ohio.

The Scouting Trail to Manhood (scouting activities); *Glimpses of School Life; Life in a Battle Creek Junior High School;* Battle Creek Schools, Battle Creek, Mich.

Corrective Work in Physical Education (correcting individual students' defects in posture and alleviating foot abnormalities), Benjamin Franklin High School, Rochester, N. Y.

Vocational Household Arts in the Beverly High School, Beverly High School, Beverly, Mass.

Patches in the Making (to show planning and cooperation among school departments in play production); *A Personal Assignment* (vocational guidance); *This Is Our Challenge* (deals with problems of housing in Norfolk); Blair Junior High School, Norfolk, Va.

Looking Forward (6 reels depicting an exhaustive study of the program of the Woman's Division of the Department of Hygiene); Brooklyn College, Brooklyn, N. Y.

Adventures of a Cub Reporter; Does My Slip Show? (traffic safety); *Curses! Foiled Again!* (melodrama); Central High School, Evansville, Ind.

Safety in the Home, Central Junior High School, Muskegon, Mich.

Orientation Film on the Work of a Specialized Vocational High School, Central Needle Trades High School, New York, N. Y.

The Child Creates (art expression in elementary schools); *Insects and How to Collect Them; Growing Things* (practical gardening for elementary grades); *Nesting Habits of Birds; Winter Birds* (feeding habits); *Protection of Florida Birds* (work of Audubon Society); *Play Ways for Posture* (activities of elementary pupils conducive to good posture); Cleveland Heights Board of Education, Cleveland, Ohio.

Our Children Learn to Read, Dearborn Public Schools, Dearborn, Mich.

Today's Activities in the Detroit Public Schools, Detroit Public Schools, Detroit, Mich.

Date Gardens (shows various stages of cultivation of dates); Eagle Rock High School, Los Angeles, Calif.

Escape to Freedom (dramatically compares life under dictatorship with that under democracy); East Side High School, Newark, N. J.

Belleville vs. East Side (football game and parade); East St. Louis High School, East St. Louis, Mo.

Adult Education, Edison Junior High School, West Orange, N. J.

Life in Colonial New England (reenactment in color and in costume of colonial farm life); Everett Vocational High School, Everett, Mass.

This is Washington (guidance for incoming freshmen); *Emphasis on Science* (shows what high schools do to train students for careers in scientific field); *Intro-*

duction to Poetry (interpretation of rhythm); *Washington Heights* (historical); George Washington High School, New York, N. Y.

Santa Clara Valley (documentary by 6th graders); Hester School, Alameda, Calif.

Or What Is a Library For? (improvement in manners to win social approval); Highland Park High School, Highland Park, N. J.

Secondary Education (regular and extracurricular program of the senior high school); Houston Public Schools, Houston, Tex.

Engineering at Iowa State; Agriculture at Iowa State; Home Economics; Iowa State College, Des Moines, Iowa.

Puppetry (steps in puppet making and manipulation); Jefferson School, Wauwatosa, Wis.

Extra-Curricular Activities, McMain High School, New Orleans, La.

Growing through Movies (shows activities as outgrowth of proper use of educational films); Meadowbrook School, Norfolk, Va.

Time to Spare (a teacher-training film for one-teacher schools); Mercer County Schools, Mercer County, W. Va.

Learning by Doing (children engage in activities centered about a project on bread); Michigan City Schools; Michigan City, Ind.

How to Relate Home Economics to Everyday Living, New Brunswick Junior High School, New Brunswick, N. J.

Education in Our Town (from nursery school to adult education); *Hillhouse High-Lites* (production of school newspaper); New Haven High School, New Haven, Conn.

Arithmetic in the Oakland Public Schools; Fifth Grade at Work; Kindergarten at Work; Physical Education; Reading in the Oakland Public Schools; Keeping Step with Modern Youth; Oakland Public Schools, Oakland, Calif.

The Construction of a Light Airplane; Drafting Tips; Baby Care: Feeding; Pennsylvania Local Government in Action; Teach Them to Drive; Your College (describes activities of Penn State College); (all above are sound films) Pennsylvania State College, State College, Pa.

Industrial Education in the Philadelphia Public Schools (portrays program of studies in the vocational schools); Philadelphia Public Schools, Philadelphia, Pa.

Art Goes Everywhere (exposure of children to art experiences from pre-school to 6th grade level); Roosevelt School, Detroit, Mich.

Living and Learning in the San Diego Schools, San Diego Schools, San Diego, Calif.

Armistice Day Celebration, Southern Junior High School, Baltimore, Md.

The Perfect Rider—How to Mount a Horse; The Social Aspects of Radio, Posture; Stephens College, Columbia, Mo.

Color (basic principles and correct color combinations); *Lettering* (correct finger and hand manipulation); Sullivan High School, Chicago, Ill.

So You're Going to College (fraternity life); *Winter's Highlight—Carnival* (skating, skiing, snow sculpture); *Science Serves the Farmer* (work of agricultural station); *May Day Pageant; A Day at the Forestry Camp; Isle of Shoals* (marine biological laboratories); *Development of the Town Forest; For the State and Nation* (75th anniversary celebration of the university); University of New Hampshire, Durham, N. H.

Child Growth in the Elementary School, William Raupp School, Lincoln Park, Mich.

DO's for Using Motion Pictures

DO vitalize your teaching with pertinent motion pictures.
DO secure a suitable teaching film catalogue.
DO order teaching films at least thirty days in advance.

DO check accompanying instructor's manuals and film guides.
DO prepare student-teacher planning guides to facilitate learning.
DO preview film before using it.
DO set up projector and focus image on screen before group meets.
DO have sufficient lengths of extension cord, plugs, and extra projector lamps.
DO check seating.
DO check lighting.
DO check ventilation.
DO prepare student before presenting film.
DO present film in a smooth, professional manner.
DO use film information as soon as possible.
DO test students' understanding of the lessons.
DO reshow film if necessary.
DO make your own teaching film to cover specific lessons.

Courtesy of Victor Animatograph Corp.

Using motion pictures to develop social, civic, and economic competence.

QUESTIONS

1. Why are motion pictures a valuable teaching aid?
2. What are ten important sources of educational films?
3. Why is it important to select the proper film?
4. Why is it important to check everything before a film showing?
5. What items should be checked before a film is shown?
6. What items are involved in a film preview?
7. How should a projector and screen be set up?
8. How would you check seating arrangement?

9. How should room lighting be checked?
10. How would you test student understanding?
11. Why should all instruction be reviewed?
12. Why are instructors' manuals and film guides helpful?
13. What are the advantages of using a student-teacher planning guide?
14. What are rear projection machines?
15. How can motion pictures be used to develop social values?

PROBLEMS AND PROJECTS

1. To get a smooth performance, what should be checked before a silent film is projected to a group? Give these items in detail.

2. If you use a sound motion picture there are additional items to check. What are they?

3. What are the chief items involved in caring for a projector?

4. Demonstrate to your instructor how you would operate a movie projector—including threading of film, as well as its projection.

5. Write an outline giving suggestions for making a "home-made" or "company film."

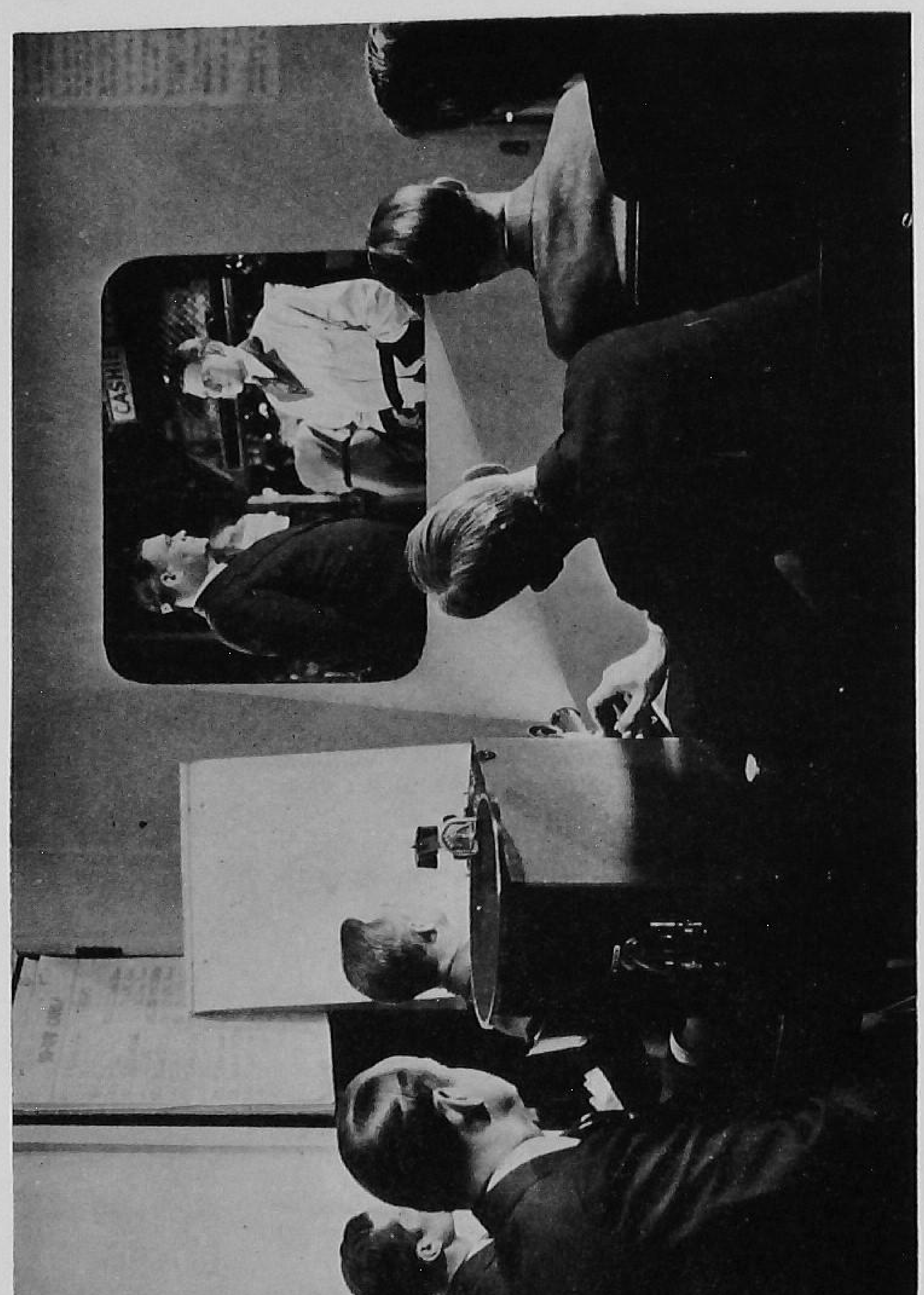
6. After a film has been exposed and processed it is necessary to edit it. What are the important factors involved in editing film?

7. Prepare a script for a proposed motion picture in your area of instruction.

8. Select a motion picture that can be used in your subject and prepare a suitable teaching guide to be used with it. Indicate (1) aims, (2) content, (3) suggested student activities, (4) suggested evaluation techniques, and (5) other resources.

9. Divide class into committees. Have each committee select a pertinent problem dealing with some phase of civic, social, and economic development. Then have each committee prepare a script for a proposed motion picture. If possible, as a culminating experience, have the committee produce the actual motion picture.

10. Discuss the "DO's for using motion pictures."

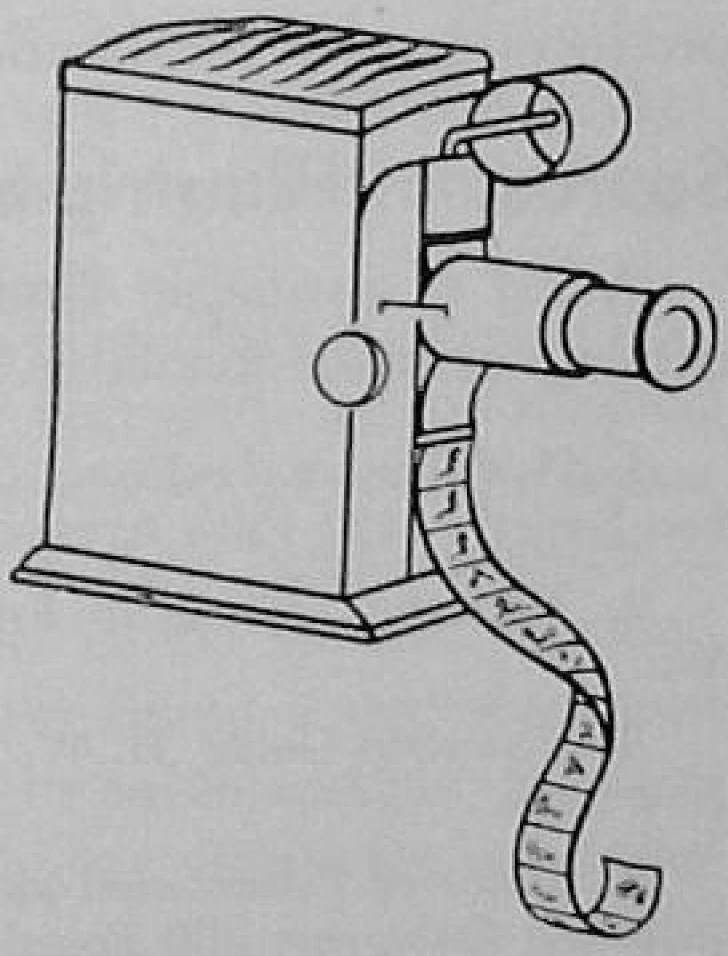


Courtesy of the Jam Handy Organization

A sound slidefilm projection for job training.

Discussional Filmstrip and Sound Slidefilm

In many teaching areas the filmstrip and sound slidefilm are considered the most potent type of audio-visual teaching aids. The use of these teaching aids in practically any learning situation will give equally satisfactory results. One advantage over the motion picture is that each picture on the discussional filmstrip or sound slidefilm (when used without a record) can be readily projected on the screen for any length of time. Students and instructor can then discuss the contents as exhaustively as may be required by the rate of learning desired.

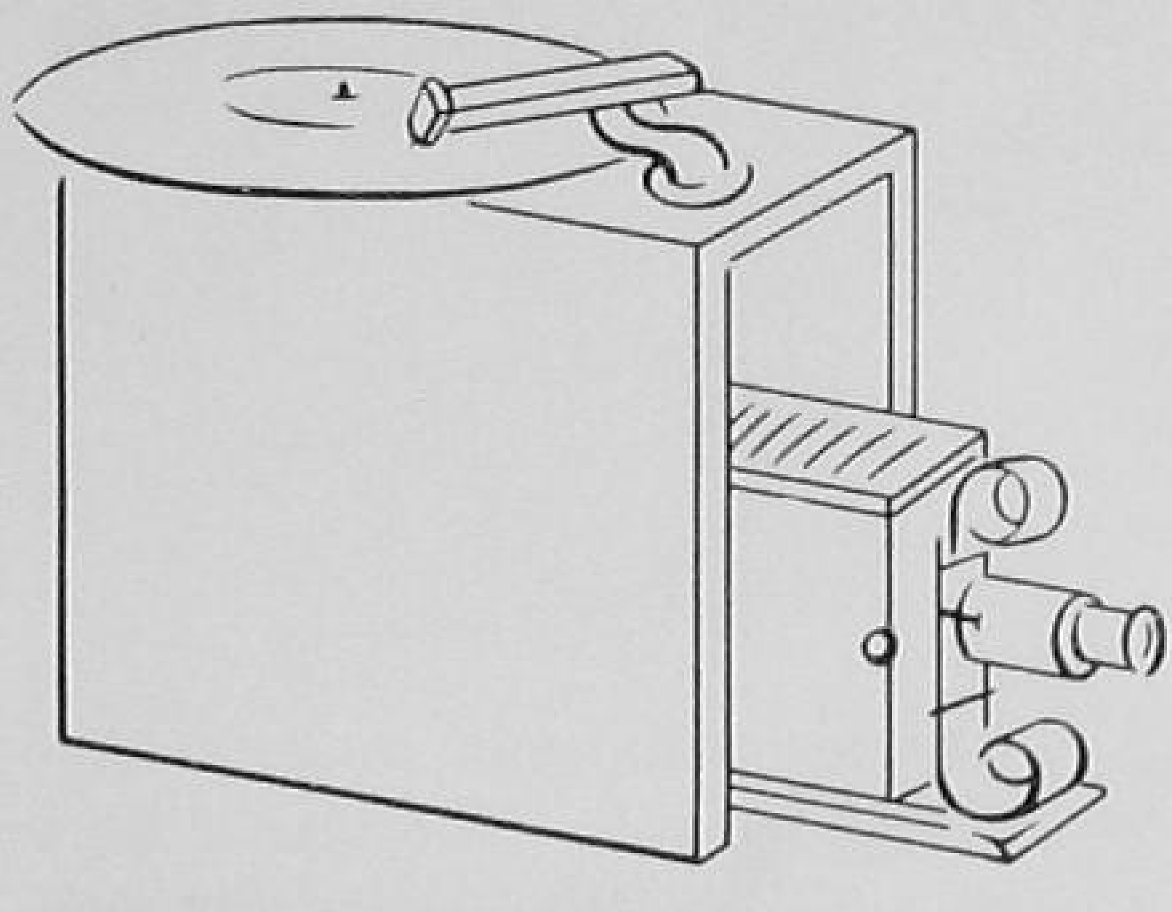


Discussional filmstrip is a continuous strip of film consisting of individual frames or pictures arranged in sequence, usually with explanatory titles. Each strip contains from twenty-five to one hundred pictures or more with suitable copy.

Sound slidefilm is similar to filmstrip, but instead of explanatory titles or a spoken commentary which is read from a guide, explanations are given audibly by a record which is synchronized with the picture. A faint bell-like sound indicates when the next picture should be shown.

The film itself is the "candid camera" or 35 mm. type used for making individual pictures or slides, but the strip of film is uncut. If used properly, sound slidefilm will increase pupil interest, clarify lessons, and save considerable teaching time. The compact form, ease of projection, and the comparatively low cost of sound slidefilm have contributed greatly to its widespread use. A large number of commercial training film producers are concentrating their efforts on this type of audio-visual device, and eventually a majority of the teaching areas will be adequately covered.

In order to overcome the difficulty of synchronizing the record with the corresponding picture, several manufacturers, such as Operadio, Illustravox, Soundview, and O. J. McClure, provide sound slidefilm projectors that automatically advance the film in time with the record. Instead of the bell-like sound notifying the operator to advance to the next frame, the electronic action caused by a sound wave or a light ray (sound wave incorporated in record—light ray regulated by holes in film) automatically advances the film to the next picture. It is not too difficult to convert your present sound slidefilm to operate with an automatic projector. This conversion, however, involves technical skill, and you should consult your commercial film producer or your local audio-visual dealer concerning this matter.



Sources of Filmstrip and Sound Slidefilm Catalogues

A list of available filmstrips and sound slidefilms may be found in catalogues made available by the following organizations.

1. *Audubon Audio-Visual Catalog*, Photo and Film Department, National Audubon Society, 1130 Fifth Avenue, New York 28, N. Y Free.

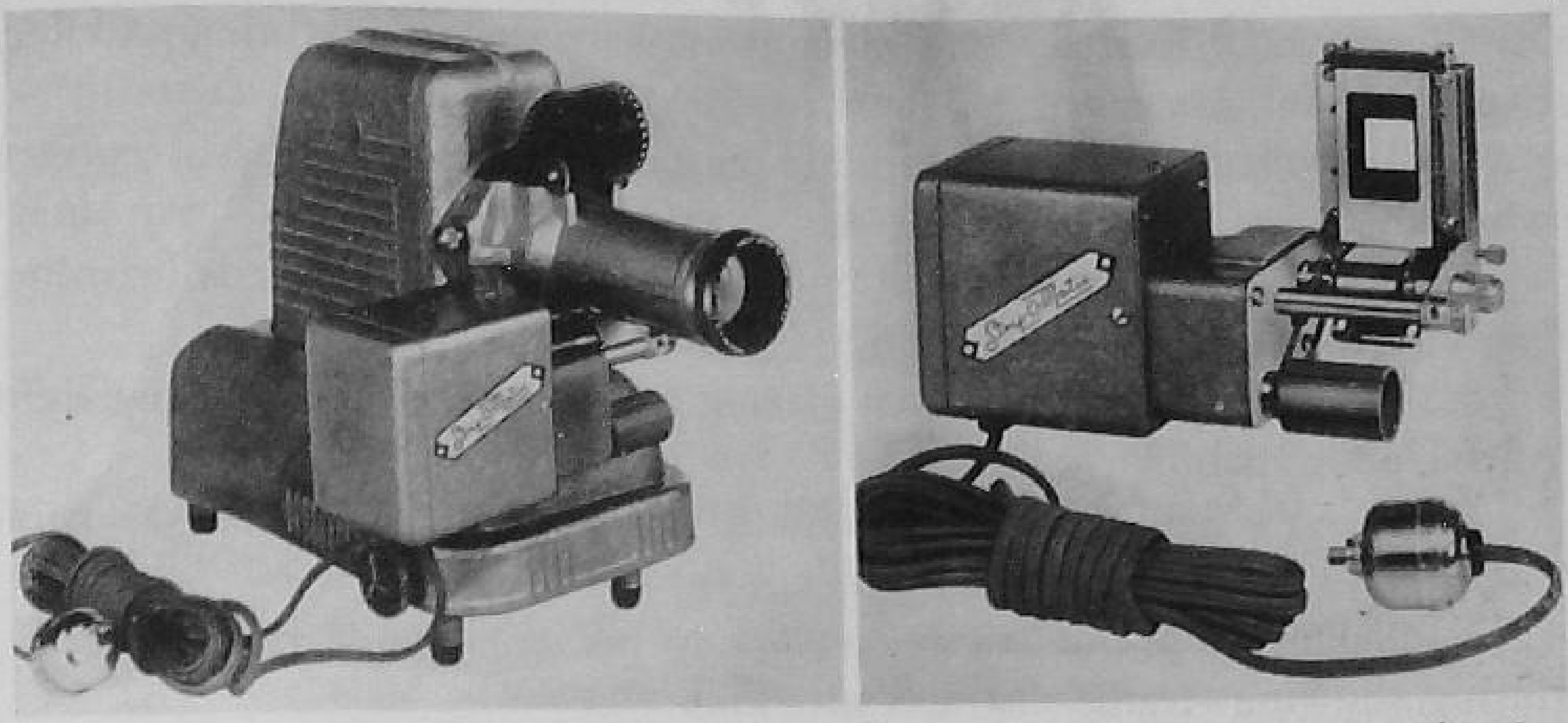
2. *Educators' Guide to Free Slidefilms*, Educators Progress Service, Randolph, Wis.

3. *Filmstrip Guide*, H. W. Wilson Company, 950 University Avenue, New York, New York.

4. *Index of Educational and Visual Training*, Westinghouse Electric and Manufacturing Company, 306 Fourth Avenue, Pittsburgh, Pa. Free.

5. *Picturol, SVE Educational, SVE Protestant Religious, SVE Catholic Religious, and General Educational Catalogs*, Society for Visual Education, Inc., 100 East Ohio Street, Chicago 11, Ill. Free.

6. *Slidefilm and Motion Pictures to Help Instructors*, The Jam Handy Organization, 2821 E. Grand Boulevard, Detroit 11, Mich. Free.



Courtesy Viewlex, Inc.

A remote control filmstrip advance mechanism—the Strip-O-Matic permits the instructor to operate the projector from any part of the classroom.

7. *Stillfilm Catalog*, Stillfilm, Inc., 8443 Melrose Avenue, Hollywood, 46, Cal. Free.

8. *Visual Training Aids*, Castle Films, 445 Park Avenue, New York, New York. Free.

How to Use Filmstrip and Sound Slidefilm

Determine the right spot. With a list of available filmstrip and slidefilm in mind, the instructor should check through his teaching plan and note the specific lessons that could be clarified by the use of these aids. Placing the title and date for using a filmstrip or slidefilm in an audio-visual aid column in the lesson plan will serve as a reminder and will indicate when the necessary projecting equipment should be secured. From time to time, new material covering various subjects will appear on the market. Do not hesitate to revise your lesson plans when necessary in order to keep up to date.

Determine the correct filmstrip and sound slidefilm. Although it is possible in most cases to operate these films so that only a few selected pictures or frames are used, it will be more convenient to cover the lesson or subject by showing the pictures or frames in their normal sequence. Make certain the filmstrip or slidefilm pertains to the specific teaching problem. Many business firms and schools have found it necessary and worth while to produce filmstrips or slidefilm to cover specific exercises or subjects peculiar to their activities. Producing filmstrips or sound slidefilm is a simple operation, which will be explained later in the chapter.

Check all physical features. In order to assure a successful presentation, the instructor should check the classroom, seating arrangement, and projection.

Classroom. The teaching place must be prepared if the most effective teaching is to result. Below are five things to check.

1. Test electrical outlet to make certain you have electrical current when the room lights are off.
2. Provide sufficient ventilation—a stuffy atmosphere retards learning. Sacrifice darkness for ventilation.
3. Prevent outside light from glaring into students' eyes—glaring light causes poor visibility.
4. Avoid placing screen in a cluttered room. All unrelated visual aids should be removed.
5. Place "Keep Out" signs on door to prevent people from entering during showing—traffic distracts attention.

Seating arrangement. Properly seated students learn more and remember longer. Bad seating brings poor results. The following suggests what to do to get beneficial results.

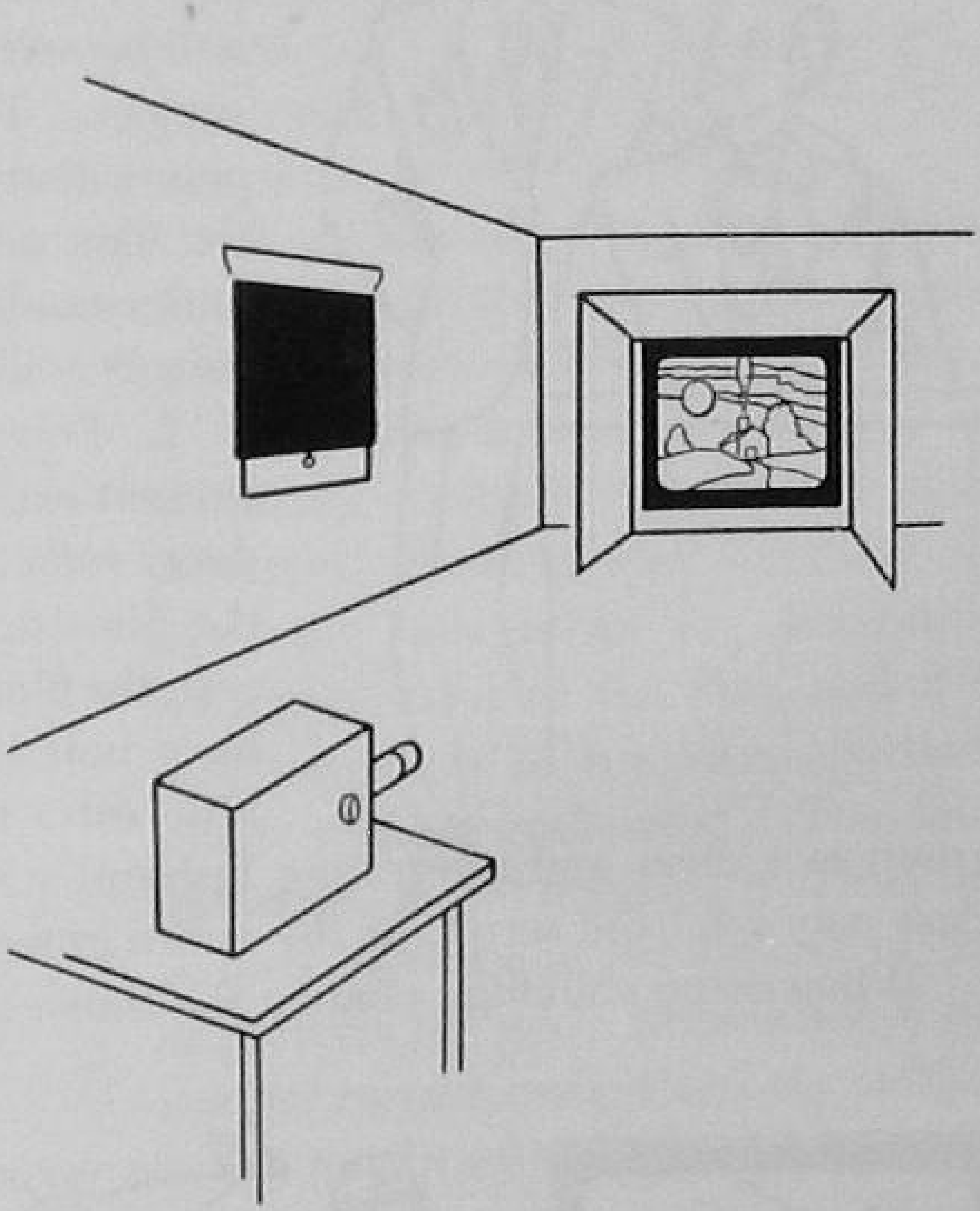
1. Avoid crowding. If necessary, divide group into two sections.
2. Seat as many students as possible between projector and screen—this is the best position for oberving picture.
3. Place chairs as close as possible to the light beam.
4. Keep all chairs within a space formed by a 60-degree angle.
5. The floor or a wooden plank may be used for chairs, but if possible, use soft, comfortable seats. A comfortable environment accelerates learning.

Focal Length of Lens	Type of Slide	DISTANCE FROM SCREEN IN FEET															
		1′	2′	3′	4′	5′	6′	8′	10′	15′	20′	30′	40′	50′	75′	100′	150′
		WIDTH OF PICTURE															
2″	D-35	7″	15″	23″	31″	39″	49″	5′3″	6′7″	9′11″	13′3″	20′0″	26′8″	33′4″	...	...	...
	S-35	5″	10″	15″	21″	26″	32″	43″	53″	6′9″	9′0″	13′6″	18′1″	22′7″	34′0″	...	...
	Bantam	8″	16″	26″	34″	44″	52″	5′10″	7′4″	11′2″	14′10″	22′4″	29′10″	37′4″	...	...	...
3″	D-35	4″	9″	15″	20″	25″	31″	42″	52″	6′4″	8′10″	13′3″	17′9″	22′2″	33′4″	...	...
	S-35	3″	6″	10″	14″	17″	21″	28″	35″	52″	6′10″	9′0″	12′	15′	22′7″	30′1″	...
	Bantam	4″	10″	16″	22″	28″	34″	46″	58″	7′2″	9′10″	14′10″	19′10″	24′10″	37′4″	...	...
5″	D-35	...	...	...	...	15″	17″	24″	31″	49″	5′3″	7′11″	10′7″	13′3″	20′0″	26′8″	...
	S-35	...	...	...	...	10″	12″	16″	21″	32″	43″	5′4″	7′2″	9′0″	13′6″	18′1″	...
	Bantam	...	...	...	...	16″	20″	27″	34″	52″	5′10″	8′10″	11′10″	14′10″	22′4″	29′10″	...
7″	D-35	...	...	...	...	10″	12″	17″	22″	33″	45″	5′7″	7′7″	9′5″	14′3″	19′0″	28′7″
	S-35	...	...	...	...	7″	8″	12″	15″	22″	30″	46″	5′1″	6′5″	9′8″	12′10″	19′4″
	Bantam	...	...	...	...	11″	14″	19″	24″	37″	50″	6′4″	8′5″	10′7″	15′11″	21′4″	32′0″
9″	D-35	...	...	...	...	...	...	...	17″	27″	35″	52″	5′10″	7′4″	13′	14′9″	...
	S-35	...	...	...	...	...	...	...	11″	17″	23″	35″	47″	5′	7′6″	10′	15′
	Bantam	...	...	...	...	...	...	...	18″	28″	38″	58″	6′6″	8′2″	12′4″	16′6″	24′9″
11″	D-35	...	...	...	...	...	...	...	14″	22″	28″	43″	57″	6′	9′	12′	...
	S-35	...	...	...	...	...	...	...	9″	14″	19″	29″	39″	49″	6′	8′2″	12′3″
	Bantam	...	...	...	...	...	...	...	15″	23″	31″	48″	64″	6′8″	10′.	13′6″	20′3″

Approximate height of picture = 0.75 x width. D-35 = Double frame or 2″ x 2″ slide. S-35 = Single frame film strip.

Projecting the slidefilm or filmstrip. The skill with which a slidefilm or filmstrip is projected often determines the value of the teaching being offered. Some of the procedures related to projecting slidefilm and stripfilms are:

1. Under most circumstances, a darkened room is more effective than a lighted one.
2. In a semidark room, use a small, sharp image for better vision.
3. Use a brighter lamp for projection in an undarkened room.
4. Place screen in a position to avoid direct rays of outside light. If necessary, use a shadow box. A makeshift shadow box can be prepared out of cardboard or thin sheets of wallboard.



5. A larger picture requires a darker room.
6. If possible, use a beaded or white screen. A beaded screen usually will provide a more brilliant image but also causes a slight distortion when viewed from the ends of a wide room. In this case a plain white screen is recommended.
7. When using the back of a map or a makeshift screen of paper or cardboard, the screen must be smooth and flat to avoid obtaining a distorted picture.
8. Place projector in a direct line in front of screen to insure proper focusing.
9. Set projector on a sturdy table or stand and, if possible, high enough to extend over the heads of the group.
10. Fasten the electric cord to the leg of the table to prevent the projector from being knocked off in the event someone should trip on the cord.

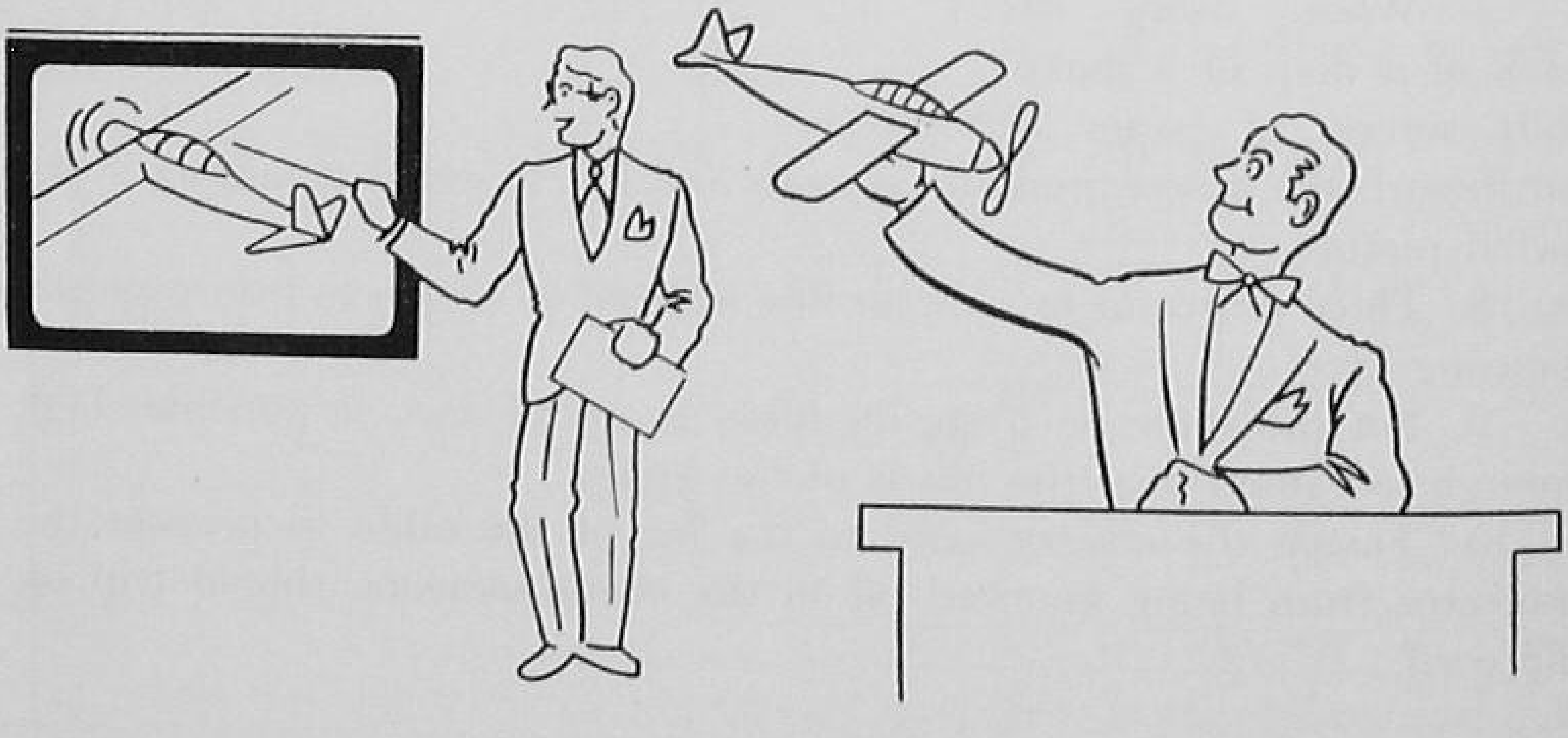
Presenting the filmstrip and slidefilm. Each group and each teaching problem will require special handling. The capacity of the group members, the nature of the problem to be solved, and the equipment and

supplies available for instructional purposes will help you determine the specific teaching procedure. However, you should observe the following basic steps for proper presentation of your lesson.

1. *Prepare student.* First with a few brief, pertinent remarks, put your learner at ease. Do not confine your opening remarks to the weather or other unrelated trivia, but study your group for clues to what would interest it. Sometimes merely giving the students your correct name will do the trick. Second, arouse each pupil's interest by showing him how he will benefit from an understanding of the subject. Third, point out the important points that students should observe in the film, and fourth tell them that their understanding and knowledge of the subject will be thoroughly tested.

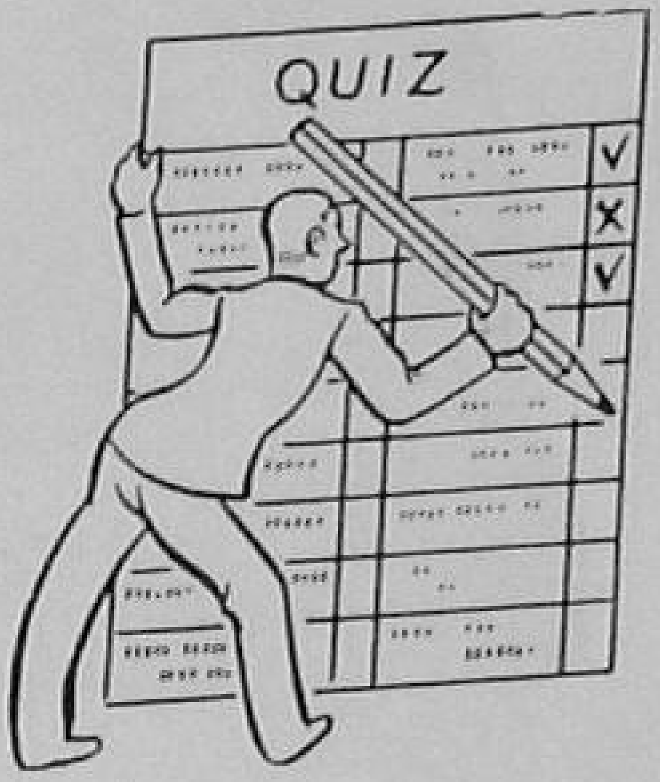
2. *Present film and instructions.* Present each frame smoothly. Allow students sufficient time to read the titles on the filmstrip. Remember that you have seen the films before, but that the students have not; therefore give the students a little extra time. Read each title to the group in a clear and interesting fashion. Occasionally a member of the class may read the script, or the entire group may participate.

When using slidefilm, change the frame as soon as the signal is given.



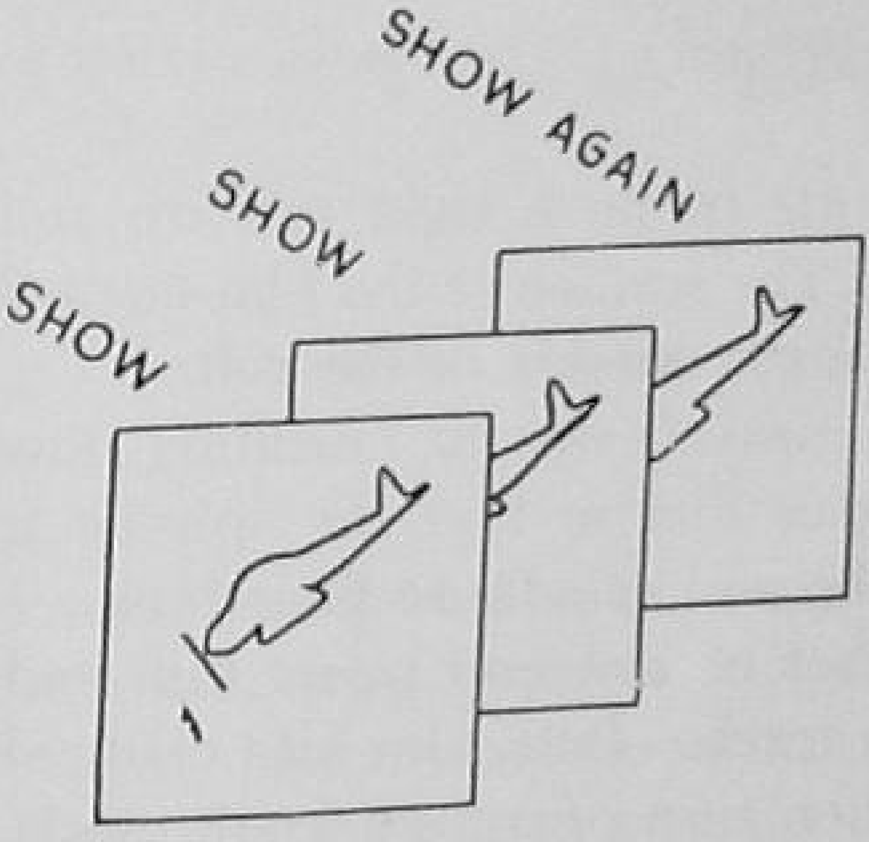
When the exercise or subjects are extremely complex or lengthy, stress the principal steps or ideas, and then reshow the filmstrip without reading the titles, but allow the student sufficient time to cover it. Remember, there is a limit to how much a student can grasp at one time.

3. *Apply teaching.* If possible, permit students to apply their new knowledge immediately. Allow them to perform and explain each step. Insist upon proper speed, timing, and the use of correct terms. They must be able to understand the information and perform the task properly, or the instruction will largely be wasted.



4. *Test students.* Check each pupil's performance. Observe his errors and weaknesses —then reteach, if necessary. Each error should be corrected and each weakness improved.

Factual and attiude lessons are best tested by simple tests, check sheets, or response cards. Questions of the objective variety, such as true-false, multiple choice, completion, or matching type, are effective, since they are easy to make, rapidly graded, and at a glance will reveal individual student weaknesses.

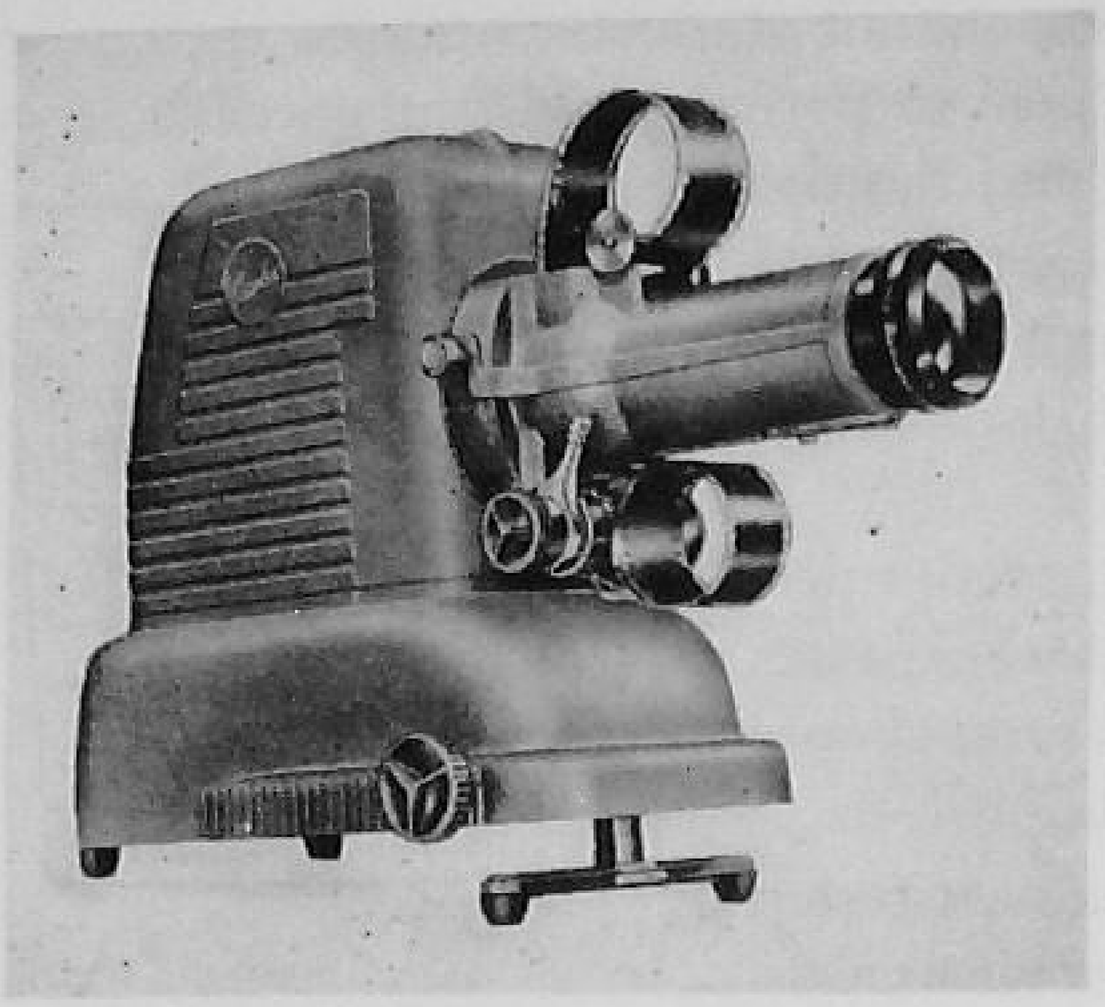


5. *Review subject or problem.* If necessary, reshow the entire film. However, filmstrip and slidefilm are especially adaptable for exhibiting certain sections of the film, and it is only necessary to use those portions which require reshowing. The final test of successful teaching is: *Does the student understand the subject or can he perform the job?* Remember, *if the student cannot understand the subject or perform the job, the instructor has not taught effectively.*

How to Operate the Filmstrip Projector

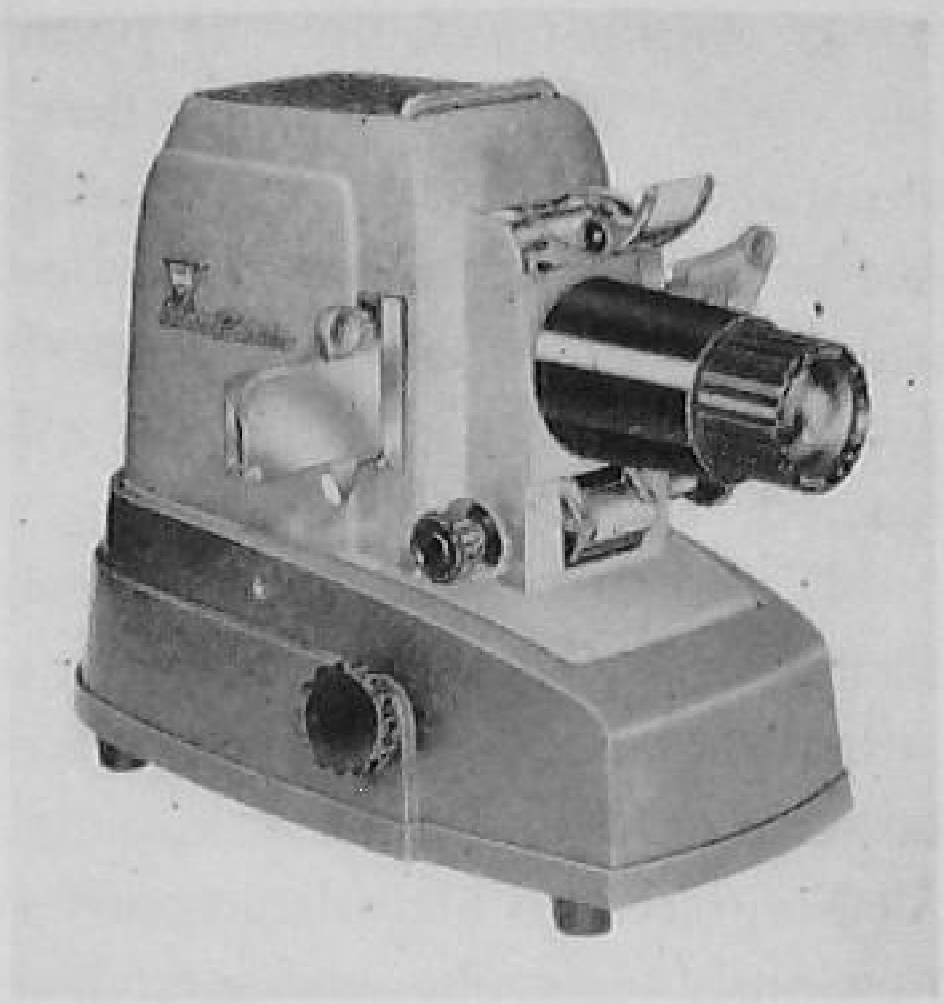
Filmstrip projectors such as the S.V.E. Schoolmaster 500 and the Viewlex V-22-C (shown on page 34) are dual-purpose projectors. Usually they are equipped with a 300-watt lamp, 5-inch, f/3.5 anastigmat color corrected lens, a slide changer, carrying case, and rewind take-up. Projectors of this type sell for approximately $70. These projectors will show filmstrips and 2 by 2-inch slides. Other similar projectors are on the market, and there is little difference in how they operate. With a little practice, these projectors can be set up and made ready for use in less than a minute. The following directions would be helpful when operating the S.V.E. School Master 500.

1. Remove projector from case.
2. Plug connecting cord into a source of alternating current. Push



Viewlex, Inc.

Viewlex Model V-22-C—Combination Slide and Filmstrip Projector.



S.V.E.

Schoolmaster "500" Filmstrip Projector with slide changer in place.

switch to "fan" position to be sure fan is operating. Then push switch to "lamp." Now turn to "off" position.

3. Hold filmstrip so first picture or title frame is right side up and printing can be read in a normal manner. The surface of the film toward you, when so viewed, should always be on the outside of the roll.

4. Hold film so that unrolled end is away from you (printing now reads backwards). Raise spindle and place film so that the spindle is in the center of the rolled film. Lower film and spindle to film track.

5. Gently pull out 6 inches to 8 inches of film and insert film end into film channel immediately behind film track. Push film into channel far enough to engage the sprocket and then turn operating knob clockwise.

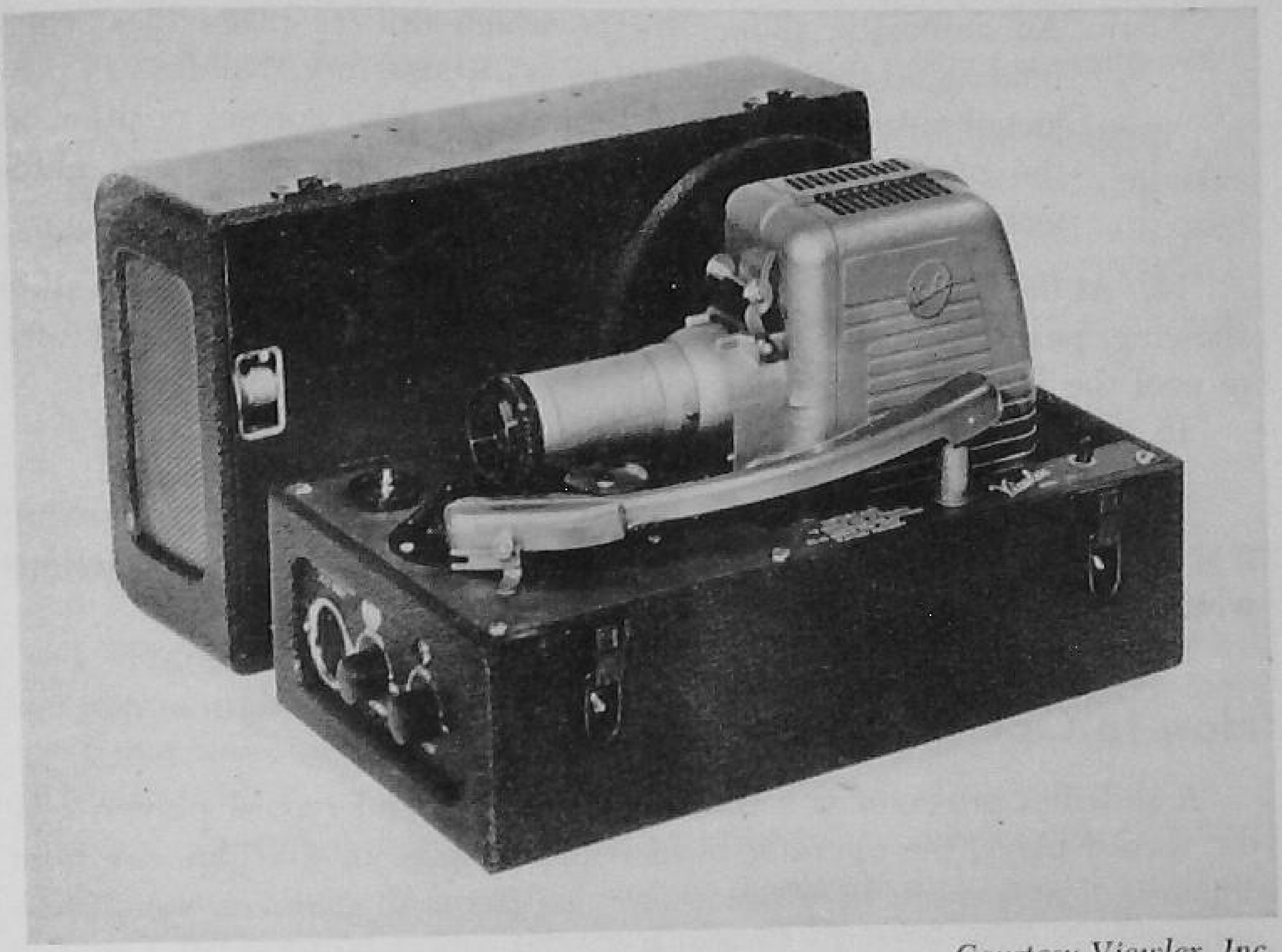
6. Turn switch to "fan" as above, then to "lamp." Turn objective lens out counterclockwise about 1½ inches. Advance film to first picture and complete focusing by turning lens until image is sharp.

7. Parts of two pictures may appear on the screen. To correct this, turn the framing control knob (on right side of projector and behind operating knob) in a clockwise direction until one picture is centered on the screen.

8. Picture may be raised on the screen by rotating the large elevating knob located on right side of projector.

9. Film may be advanced by turning either of the two operating knobs located on adjacent sides of the projector.

10. To show 2 by 2 slides, remove filmstrip from the projector by turning operating knob until film is ejected. Raise gate latch located on right side opposite film track and swing lens to one side. Grasp small



Courtesy Viewlex, Inc.

A slidefilm projector combines filmstrip projector with record player.

knurled knob on film track assembly at aperture, pull forward and lower to a horizontal position. Close the gate securely.

11. Lower small doors on each side of projector by sliding downward. Hold slide carrier so that the side with the inverted "V"-shaped locking lever is in your right hand and is pointed down. The "S.V.E." on the slide carrier will be facing the projector lens. Insert carrier into the spaces provided when the doors were lowered. Push carrier in all the way until stop contacts housing. Push locking lever toward projector until changer is secure. Once inserted, the slide carrier need never be removed, even when projecting filmstrips.

12. Pull slide to the extreme out position and insert slide upside down in front of carrier. Push carrier into other stop. Focus and center image on screen as mentioned above. Insert second slide to be shown into carrier on opposite side of projector. Pull or push carrier back to the initial position and remove first slide.

13. To revert to filmstrip showing, pull slide carrier to extreme out position. Open gate as above and raise film track assembly to original vertical position. Close gate securely, repeat instructions above for projecting filmstrips.

NOTE: An automatic slide changer which utilizes magazines, each holding 36 slides, is available as an accessory. Slides are projected automatically and returned to their correct position in the magazine by merely pushing a lever. Magazine automatically advances to next slide.

14. At the "end" frame of the filmstrip, or at completion of your slide showing, push switch to "fan" position and let it run for a few minutes to cool the lamp and projector. Then switch to "off."

15. Remove filmstrip or slides from projector.

For specific information on how to use your projector for showing 2 × 2-inch slides and filmstrip, refer to the manufacturer's instructions which accompany the machine.

How to Operate the Slidefilm Projector

A slidefilm projector is a combined projector and record player. As the record plays, the operator unreels the pictures in the film. A faint chime indicates when to advance the next frame to maintain synchronization.

The record used with the slidefilm projector has the appearance of an ordinary popular record, but is prepared to play at the rate of 33⅓ revolutions per minute instead of 78 revolutions per minute. This makes it possible for a record to play approximately 15 minutes before it becomes necessary to turn it over.

Both filmstrip and slidefilm may be used in the slidefilm projector without the record player. The general appearance and housing of these projectors are different, but the principles of operation are closely similar.

To insure proper performance of slidefilm projectors, check the following suggestions:

1. Follow the manufacturer's instructions for operating your specific projector.
2. Insert film, turn on projector lamp, and focus the first frame.
3. Change needles frequently.
4. Turn on the motor and warm up the tubes. If your machine has a volume and tone control, play part of the record to check it.
5. Set the arm at the correct starting point. Usually this is on the outside of the record, but occasionally it starts on the inside. The correct starting point is indicated on the record.
6. When the bell sounds, advance the slidefilm. After you get the "feel" of the mechanism, each frame should snap into position rapidly and smoothly.

How to Make Filmstrip and Slidefilm for Your Classroom

Anybody who has a 35-mm. camera can make a simple filmstrip. A filmstrip is merely a series of individual pictures arranged in a specific order on a strip of film. When these 35-mm. pictures or "shots" are used individually, they are commonly known as 2 by 2-inch slides. The following chapter on *Teaching Slides* will give specific information on how to prepare these pictures.

In preparing the filmstrip it is important to:

1. Prepare a script.
2. Plan each "shot."
3. Arrange each picture in the proper sequence.
4. Photograph each scene in the proper order. If you have used kodachrome film, clip the corner of the return address tag. This indicates that the film is to be developed in strip form and not cut into individual slides.
5. If it is impossible to take the pictures in the proper order, collect all the desired shots, indicate the proper sequence, and have the picture put on a strip of film. This service is offered by most local photography stores.
6. Titles may also be added to your filmstrip by your local photographer.
7. Carefully store your film in a filmstrip container.
8. Title and file each filmstrip on the top of the container.

The Educational Department of the Eastman Kodak Company recommends that the following points be observed in planning and producing your own filmstrip or sound slidefilm.

1. *Decide the main purpose* of the filmstrip—is it to tell, sell, or explain, and what? Be as specific as possible, for unless the basic concept of the filmstrip as a whole is given sound consideration, the story told by the individual slides may be faulty.
2. *Determine the audience* to which the filmstrip will be shown as well as their attitude and experience level. This is important because, although you can speak to technically trained personnel about technical matters, you may only confuse a housewife. Plan your illustrations, commentary, and general story so that it will hit the audience in which you are principally interested.
3. *Plan the character* of the filmstrip and presentation, after considering the purpose of the filmstrip, and the audience. Is it to be humorous, sober, breezy, informative? Is it to shock the viewer into action? Is it to start with a bang to catch and hold attention?

4. *Outline the story* or message. When outlining and making filmstrips of the "how-to-do-it" type, use a "three-times-over" technique to impress facts on the viewers' minds. First show the process being performed correctly, from the viewpoint of an observer. Then show it from the same viewpoint, being done improperly, to emphasize the common mistakes that may be made. Finally, review the process a third time with the camera in a "first person" viewpoint. Here show the action correctly—just as it would appear if individuals in the audience were doing the job.

With general informational filmstrips, the outline should follow good story-telling form. The purpose, the audience, and the character of the presentation will determine to a large degree the manner in which the standard filmstrip of this type is approached and handled.

At this point take the following production steps:

1. *Translate words into picture ideas.* This can be done most easily by making a rough sketch of the picture on a small white card together with a brief outline of what will be said in connection with each picture. These cards will enable the teacher and the photographer to plan the layout and composition of the various pictures for the most effective results. They will also enable the photographer to plan a sequence of long shots, medium shots, and close-ups, varied as necessary for best effect.

2. *Plan the shooting schedule.* Group similar subjects to save time. This is an excellent practice where the budget must be watched closely. It is also good general practice in the production of any filmstrip.

3. *Shoot the pictures.* The teacher and the photographer must work very closely together at this point. The teacher should make every effort to see that the photographer emphasizes the important points and eliminates irrelevant details. Watch backgrounds, foregrounds, and surroundings in all sets to make certain nothing incidental distracts from the principal elements of the picture.

4. Finally, *"talk" the pictures*—and thus develop the commentary. If the pictures are to be shown with recorded commentary, the commentary should be checked and rechecked—presented and re-presented—to individuals and groups, as tests before final recording takes place. If the talk is to be delivered informally by an individual, the speaker should be encouraged to record it on a magnetic or some other recording device, and to practice the delivery until he has his talk down pat. Constant practice with a recorder is the best possible means of grooming speech and producing a commentary which is direct, forceful, and to the point.

Slidefilm records for home-made filmstrips. A home-made filmstrip may be converted to a slidefilm by preparing an accompanying record.

The fidelity of home-made records is not as high as those produced commercially. However, with care and practice, you can produce satisfactory results. An ordinary recording set or radio attachment that can cut records at 33⅓ revolutions per minute will be suitable.

Carefully plan your slidefilm record by proceeding as follows:

1. Prepare a brief, pertinent script for each frame.
2. Select someone having a good "radio announcer" voice.
3. To obtain accurate timing, practice reading the script while the film is being projected on a screen.
4. Use a small bell for the signal between frames.
5. Cut the record, following the directions that accompany the recording set.

Tape and wire recordings for home-made filmstrips. An increasing number of teachers are preparing tape and wire recordings to accompany their filmstrips. The same pattern should be followed here as the one suggested for preparing a record. Refer to Chapter 13 for specific suggestions and techniques for making tape or wire recordings.

Examples of Content of Home-Made Filmstrip and Slidefilm

You will be repaid many times for the effort you exert in preparing home-made teaching films. Their chief value is that they are made to illustrate and clarify your own specific subjects and lessons. For example, here are a few typical community and business subjects that have been shown in filmstrips and slidefilms:

Merchandise information
Customer routing
How to set up a counter
How to make price cards
How to display merchandise
The buying process
Sources of buying information
Community opportunities
How to use record systems
Employee morale

How to sell
Merchandise appeals
How to prepare an advertisement
How to keep a customer
How to increase a sale
How to arrange merchandise on shelf
How to trim a window
How stores lose customers
How to operate a cash register
How to improve customer contacts

The wide-awake instructor will find many subjects, manipulative skills, general information, and learner attitudes peculiar to his own situation that could be converted and illustrated in filmstrip for more effective

teaching. Slidefilms and filmstrip are applicable to any school or occupational training need.

How to Use the Tachistoscope

During the war period the tachistoscope was widely used to train men to spot instantly ships, planes, and other rapidly moving objects. Today it is being used by teachers in the classroom to improve reading, spelling, and mathematical ability, and facilitate visual memory and visual responses. The tachistoscope is a shutter-like device that may be attached to any standard filmstrip or slide projector and used for controlled flash exposures. Length of exposures may vary from one one-hundredth of a second to one second.

Tachistoscopic learning should be of much value to most children, adolescents, and adults. It offers one further technique that the capable instructor can use to improve instruction. Since much of our knowledge and understanding comes through the eyes, it is important to broaden the eye span and increase the speed of recognition. These skills help individuals read more fluently and with greater understanding as well as assist them in developing speed and accuracy when dealing with mathematical problems. The tachistoscope is also being used with much success in reading clinics and in individual remedial work.

Several projector manufacturers are now producing tachistoscopic devices and attachments similar to the S.V.E. Speed-i-o-scope. The teacher's manual which accompanies the S.V.E. Speed-i-o-scope makes the following helpful suggestions concerning the use of the tachistoscope.

Instructions for Operating Flash Mechanism

1. After the image is sharp on the screen, slip Speed-i-o-scope over lens barrel as far as it will go. Tighten set screw.
2. Attach shutter release cable to shutter release socket.
3. Set shutter speed control lever to desired speed (1 second to 1/100th second).
4. Set iris lever to Bright, Medium, Dim, or Very Dim, depending upon the amount of light you wish to give the subject matter you are flashing on the screen.
5. Press cable release button to make exposure. (Shutter can also be tripped by pressing shutter release lever, although we recommend using the cable release for smooth, vibrationless operation.)
6. If you wish to view material after exposure has been made, push lever to the right. This opens the shutter and projects the subject as a "still." Close shutter by pushing lever to left before making the next exposure. To insure proper care of this delicate instrument, do not press cable release button while the shutter is open.

Room Arrangements

The lighting of the room need not be different from that found satisfactory in the showing of slides and filmstrips.

Courtesy Society for Visual Education

S.V.E. Instructor "500" with Tachistoscope attachment. Speed-i-o-scope may be used to improve reading, spelling and mathematical ability.

Children should be so seated that all will have a clear view. Teachers should check this carefully.

The first row of children should be seven or eight feet from the screen. It is suggested that teachers experiment to find the particular size of screen image which best suits the children's visual needs and the room arrangement. The projector should be so placed that the image is large enough to be seen, without effort, by all children.

If a screen image is so bright that viewers are forced to squint, the iris lever should be adjusted to reduce the illumination.

The filmstrip or slides should be selected and the projector set up, with lens adjusted to give a sharp image, before the lesson begins.

Flashing Procedures

When first introducing the tachistoscope to children, the teachers should carefully explain what the program is, illustrate with sample items, and go through each step slowly, until all the children are familiar with the procedures.

In all subsequent lessons children should be comfortable, relaxed, and in a receptive mood. It is suggested that they pretend they are looking *through* the screen. This allows their eyes to be positioned correctly for training in perception.

The group should always be prepared for the material that is to be flashed.

They should be told whether it is a picture, a word, a phrase, a certain number of digits, forms, and so forth. When introducing new material, it is wise to allow a second glance at the picture before a pupil indicates what he has seen. *Do not repeat exposures* after the children are familiar with the procedure.

The teacher should *habitually* say something like "Ready . . . now" . . . (flash), or "First slide . . . stand by" . . . (flash), or "Ready . . . one, two" . . . (flash). The important thing is to use the same words, pace, and pattern each time.

Responses may be oral, written, or checked on a mimeographed sheet, depending upon the type of material presented and the age of the children. Since it is difficult for very young children to shift focus, oral responses are preferable; written responses should be kept at a minimum.

To insure better success in a written response, it may be wise for some children to continue looking at the screen while writing their responses. Under such conditions answers may not be uniformly placed on the paper; however, the correctness of the responses is more important. Obviously, if children are expected to check answers on a mimeographed sheet, it will be necessary for them to look at the sheet.

Timing

In acquainting the children with the S.V.E. Speed-i-o-scope, first show the slide as a still; then for one second, for one-half second, and gradually up to one one-hundredth second. Pause after each exposure and inquire if they can still see the image. It is important that children have the feeling of success in being able to see the image in as short a time as possible.

After an individual or class becomes accustomed to one one-hundredth second, it seems wise to keep at that speed and not revert to slower ones.

Length and Number of Periods

Periods of tachistoscopic work with young children should be restricted to twenty or twenty-five minutes. This can be increased to a maximum of thirty minutes for older children and adults.

Daily training periods are desirable, especially while doing remedial work. Regularity of practice periods is important.

Even after pupils have achieved satisfactory results in visual perception and in remedial work, it is desirable to continue the use of the tachistoscope as a teaching technique to introduce new material, to maintain levels of achievement, to add interest to learning, and to use for testing purposes.

Materials

Slides or filmstrips, in color or black and white, which show such subjects as animals, planes, cowboys, engines, or children help create interest and give children an opportunity to observe details.

For five-year-olds, three or four color slides during one period are sufficient because time for conversation about what they saw is important to reading readiness.

A picture should not be repeated too many times—pupils lose interest and may answer from memory. Teachers will want to plan collections of pictures on different subjects correlating with the curriculum.

Commercially prepared filmstrips and slides which present familiar objects; basic vocabulary; phrases, digits, addition, subtraction, multiplication, and

division facts, mathematical forms, and pictures may be used. These materials are exceptionally well adapted for use where flash cards are ordinarily used. (See the S.V.E. Education Catalog.)

A teacher may make her own slides. Words from the spelling lesson or difficult words from current reading may be written on specially treated glass slides, such as the S.V.E. Speed-i-o-slide. The teacher will find it possible to prepare slides on materials in other subject matter fields.

One important requirement in working with young children is to use simple material. In all cases, increase the difficulty of the material slowly so that pupils may continue to be successful. This principle should hold when using either teacher-prepared or commercial materials.

DO's for Using Filmstrip and Slidefilm

DO determine the lessons that could be effectively illustrated.
DO select the proper filmstrip or slidefilm for the specific lesson.
DO secure teaching film catalogues.
DO preview film before using it.
DO follow suggestions in film guides and instructors' manuals.
DO check classrooms.
DO check seating arrangement.
DO check projection.
DO prepare student before presenting film.
DO present film in a professional manner.
DO use a pointer to direct attention to specific details on screen.
DO permit student to apply knowledge immediately.
DO test student's understanding.
DO reshow film if necessary.
DO follow manufacturer's instructions for operating your specific projector.
DO prepare filmstrips and slidefilm to cover your own teaching problems.
DO use filmstrips and slidefilm to help develop social, civic, and economic competencies.

QUESTIONS

1. What is filmstrip? Sound slidefilm?
2. Why are filmstrips considered the best type of teaching aid for many situations? Sound slidefilms?
3. What precautions should be observed in determining the correct films to use?
4. Why should all physical features be checked before a film is shown?
5. What three physical features should be checked prior to a presentation?
6. What are the four steps involved in a good presentation?
7. What are the advantages of "home-made" or "company-made" filmstrips or sound slidefilms?
8. How can a home-made filmstrip or sound slidefilm be used to develop better social, civic, and economic understanding?

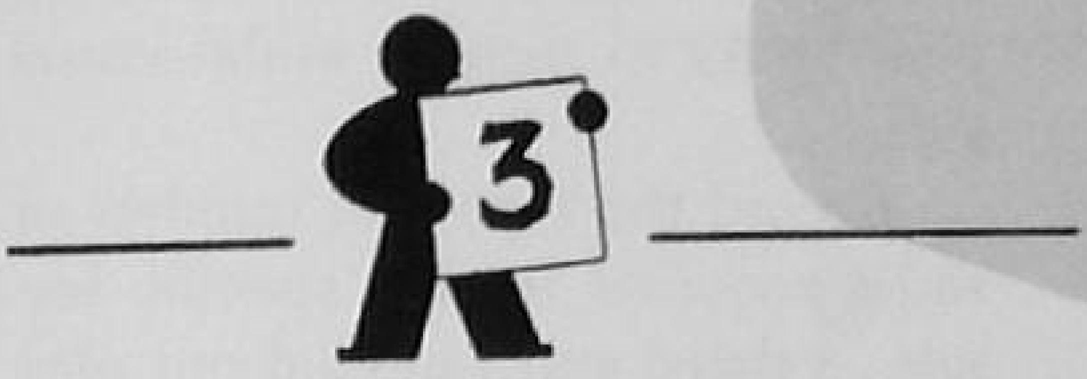
PROBLEMS AND PROJECTS

1. List the chief sources for filmstrip and slidefilm.
2. List the physical features that should be checked before a strip or sound slidefilm is shown. Consider the *place*, *seating*, and *projection*.
3. List in detail the things involved in each of the four steps of a good presentation.
4. Demonstrate the use of filmstrip and slidefilm projectors, including threading of film and projection.
5. What are the steps involved in making a simple filmstrip? Give details.
6. What are the steps in preparing a script? Give details.
7. Prepare a script for a proposed filmstrip or sound slidefilm in your subject.
8. Divide the class into three committees. Have each committee prepare an outline or script for a filmstrip or sound slidefilm that could be used to develop better social, civic, or economic understanding.
9. List 15 examples of possible content for home- or company-made filmstrip or sound slidefilms.
10. What are important "Do's for using filmstrip and slidefilm"?

Courtesy of American Optical Co.

2 by 2-inch slides and projector.

Teaching Slides



Value of slides in teaching. The use of a single slide can vitalize an entire teaching session; one slide can make a topic or a lesson remain vividly in the memories of your students. This is the reason for the success of this teaching device. A few carefully selected slides or even one pertinent slide can:

1. Attract attention.
2. Arouse interest.
3. Assist lesson development.
4. Test student understanding.
5. Review instruction.
6. Present the next lesson or subject.
7. Facilitate student-teacher participation.

The versatility, facility of selection, low cost, and ease of preparing slides make them important teaching tools.

Sources of slides. An excellent list of sources for slides, including colleges, universities, state museums, state libraries, commercial organizations, federal and state agencies, will be found in Appendix 2.

A knowledge of available slides will be helpful in making proper selection. You will soon discover, however, that even though a large number of slide collections exist, the specific slide that you would like to

use is not available or does not exist. Should you give up the idea at this point? Definitely not. Most likely you can make the slide in your own classroom. Many youngsters in elementary school have prepared excellent "hand-made" slides.

How to Use Slides

Determine the right spot. At the beginning of the teaching sessions, check through your lesson plans and note specific spots where the use of a slide would materially help in the improvement of instruction. Efficient instructors will have already devoted a column in their teaching plan books to include audio-visual aids.

Record the type and number of slides required for the specific lesson. A dated and well-laid-out plan book will act as a signaling device and inform the instructor in advance to have the slides and necessary equipment ready. Preparing necessary equipment will require several hours of initial preparation, but the instructor will find, in the long run, that it will actually save time. To keep teaching material up to date, it will be necessary for the instructor to revise it each succeeding year.

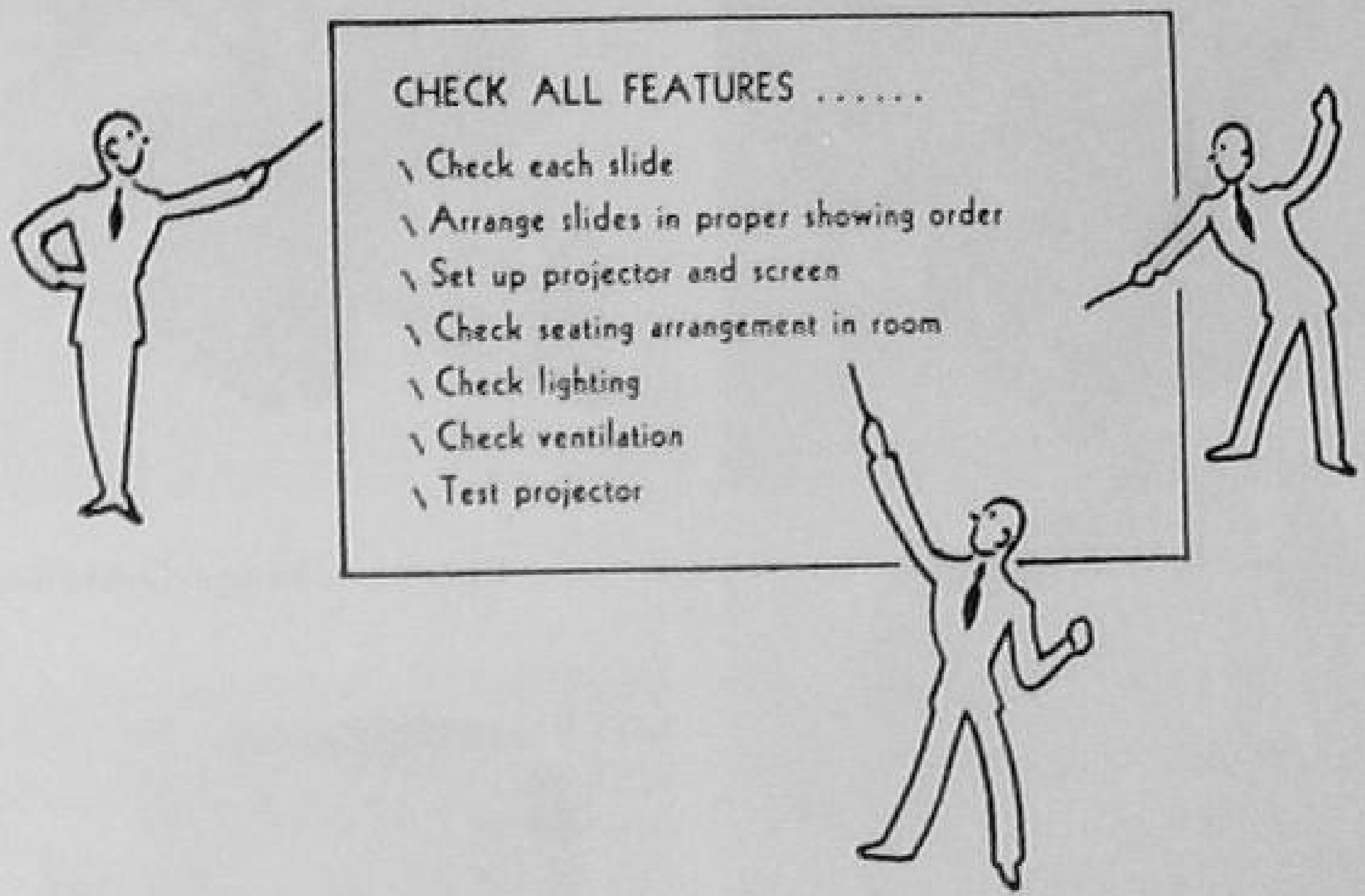
Check all physical features. The instructor can spare himself many sad experiences if he verifies the following items before the class meets:

1. *Check each slide.* Make sure you know exactly what you will say or do with each slide. A guide sheet or a 3 by 5-inch card file summarizing each slide will increase effectiveness of instruction and save much time. Each card should be filed with the corresponding number or title of the slide. Regardless of when the slide is used, you merely take the card with the corresponding slide number from the file, and needed information is then in your hands.

2. *Arrange slides in proper showing order.* If 3 by 5-inch information cards are used, make sure that they are in the same order as the slides. A desired showing order may be indicated by running a piece of colored scotch tape diagonally across the top of a set of slides, and then cutting the tape between each slide. A more permanent arrangement can be made by painting a similar diagonal line across the top of a set of slides.

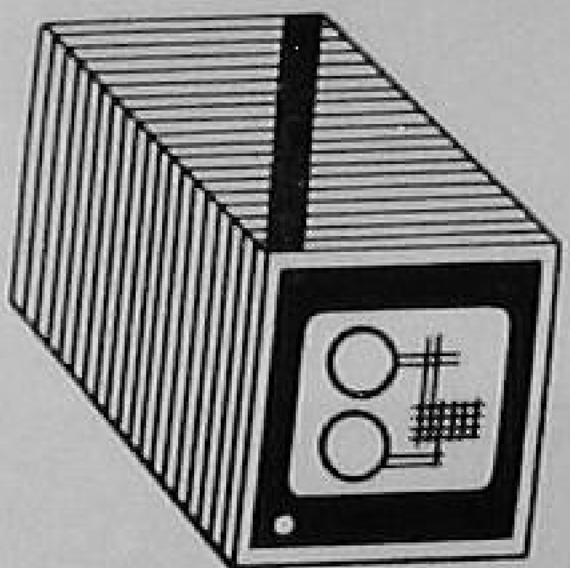
3. *Set up projector and screen.* In an ideal situation, the projector and screen would be permanent fixtures of the classroom, and it would

only be necessary to switch on the current and perhaps lower the screen. However, in most cases, it will be necessary to place the projector on a stand or table and focus the light on the screen. The distance between



the projector and screen is determined chiefly by the number in the class, shape of the room, and size of the screen. The larger the class, the more space will be needed between the projector and screen.

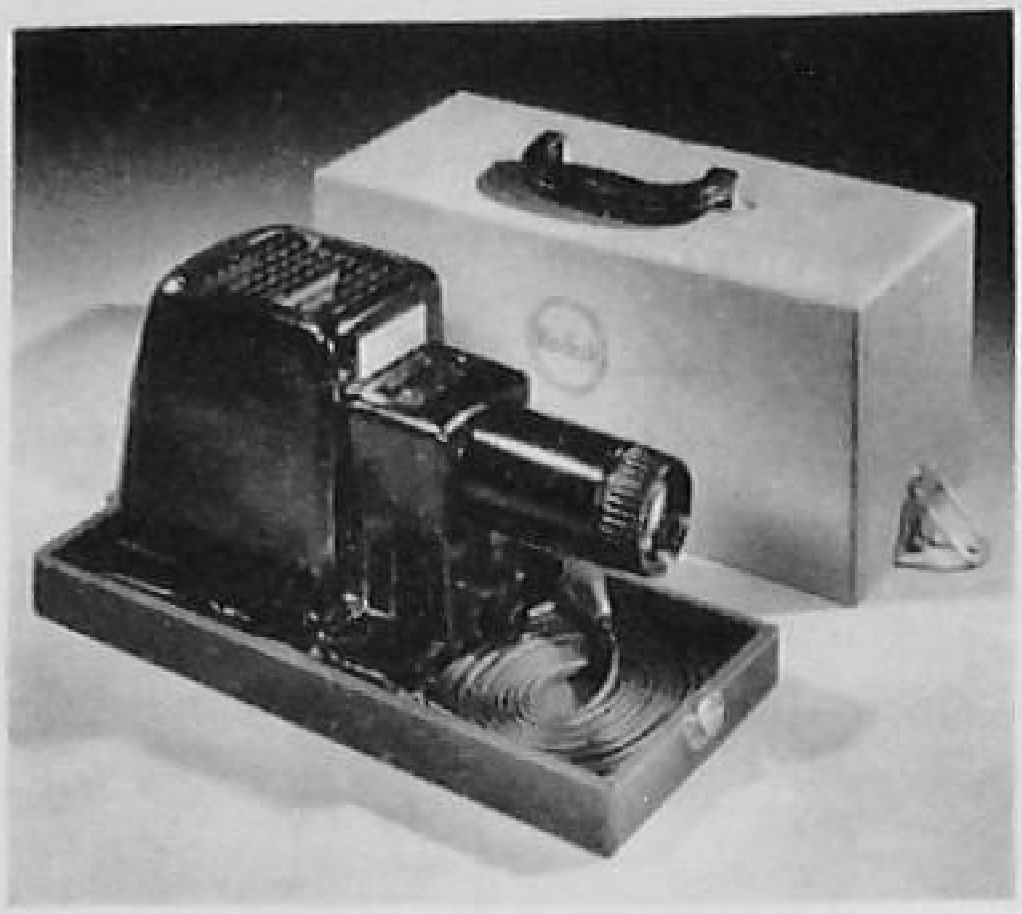
A light-colored wall, a home-made screen, or even the blackboard could be used instead of the regular commercial screen. When the projector is used in a large hall or auditorium, it will be necessary to increase the size of the lamp in the projector. Make sure the projector is focused, so that it will only be necessary to turn on the switch before projecting the slide.



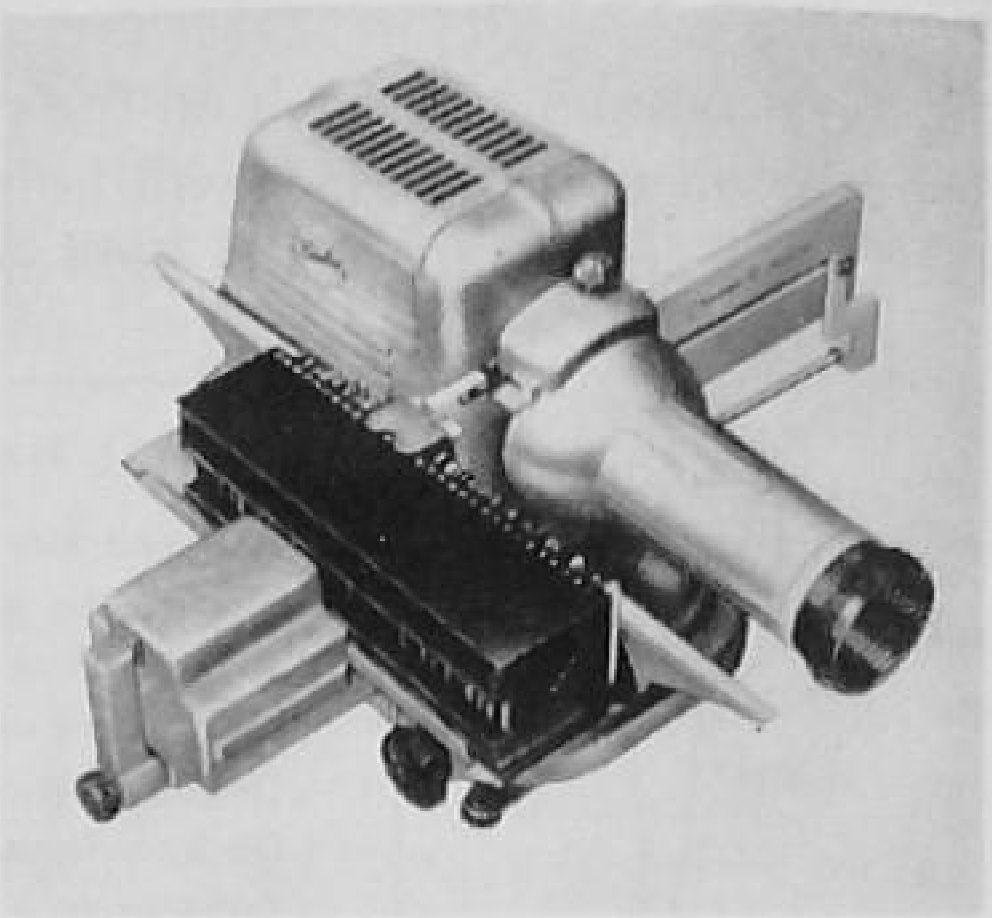
4. *Check seating arrangement in room.* If the chairs are movable, they should be arranged in an area forming a 60-degree angle between the projector and screen. In a room equipped with secured desks or tables, the students should be confined to a similar area, avoiding entirely the use of the outer end seats on the front rows. It is also advisable to leave approximately a six-foot space in front of the screen.

5. *Check lighting.* Even though it is possible to exhibit slides in an undarkened room, it is suggested that the room be darkened as much as possible for the best results. The electric outlet for the projector should work independently of the room lights. Avoid rays of light falling on the screen, and, if possible, place the screen in front of the source of light.

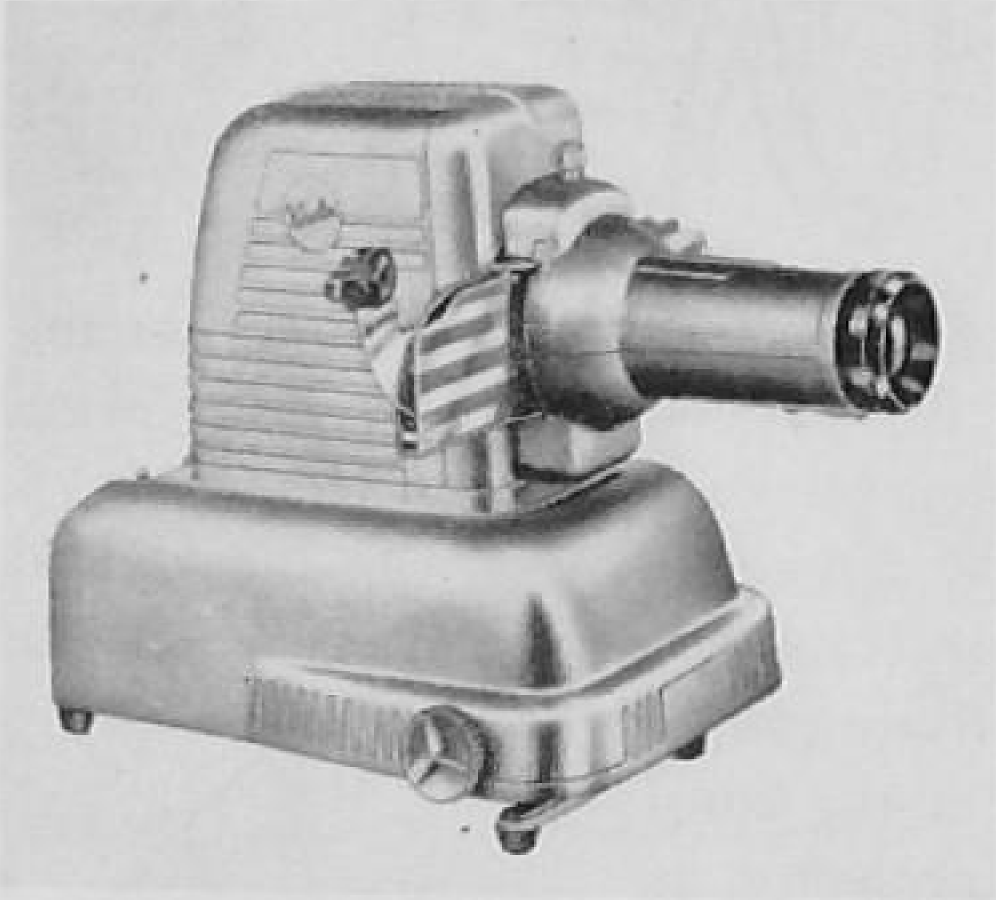
6. *Check ventilation.* A poorly ventilated classroom can spoil an excellently planned lesson. A cardboard window ventilator, of the type commonly used in a "darkroom," may be purchased at a nominal cost from most photographic supply stores. It is used at the bottom of the win-



Kodaslide Merit Projector.

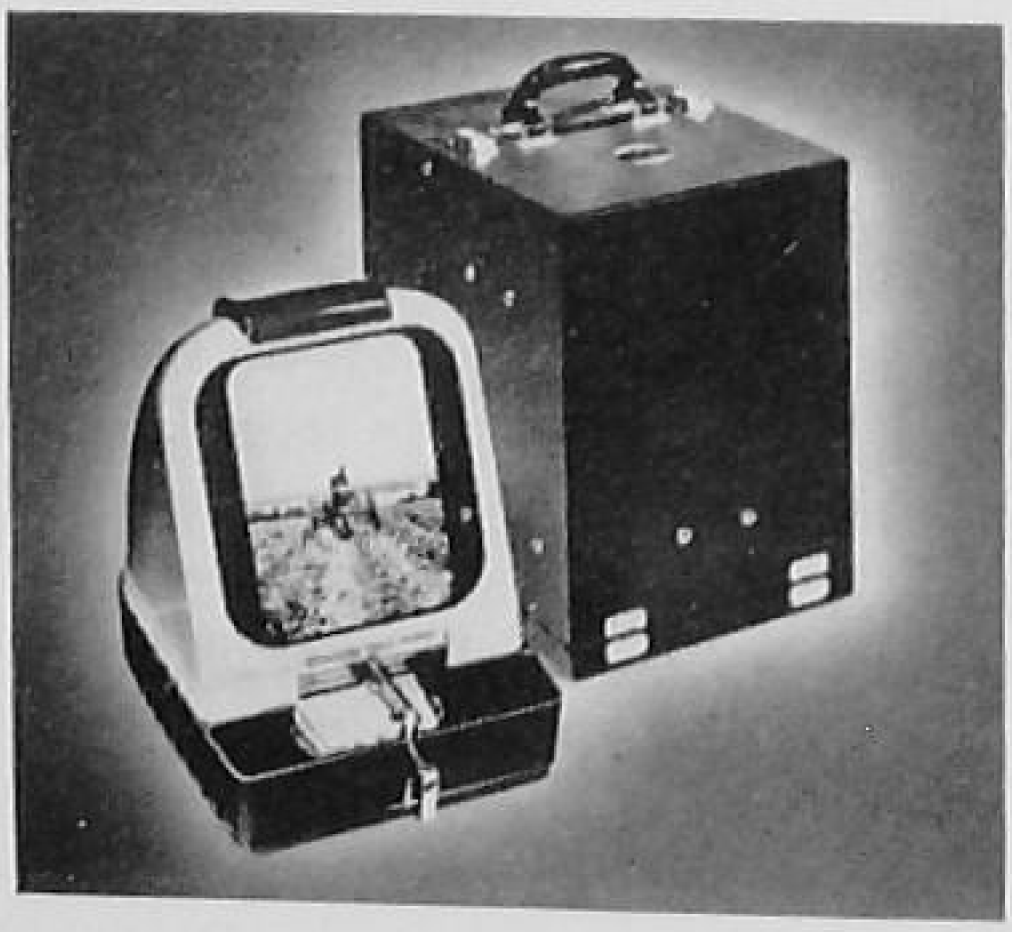


Viewlex Change-O-Matic.

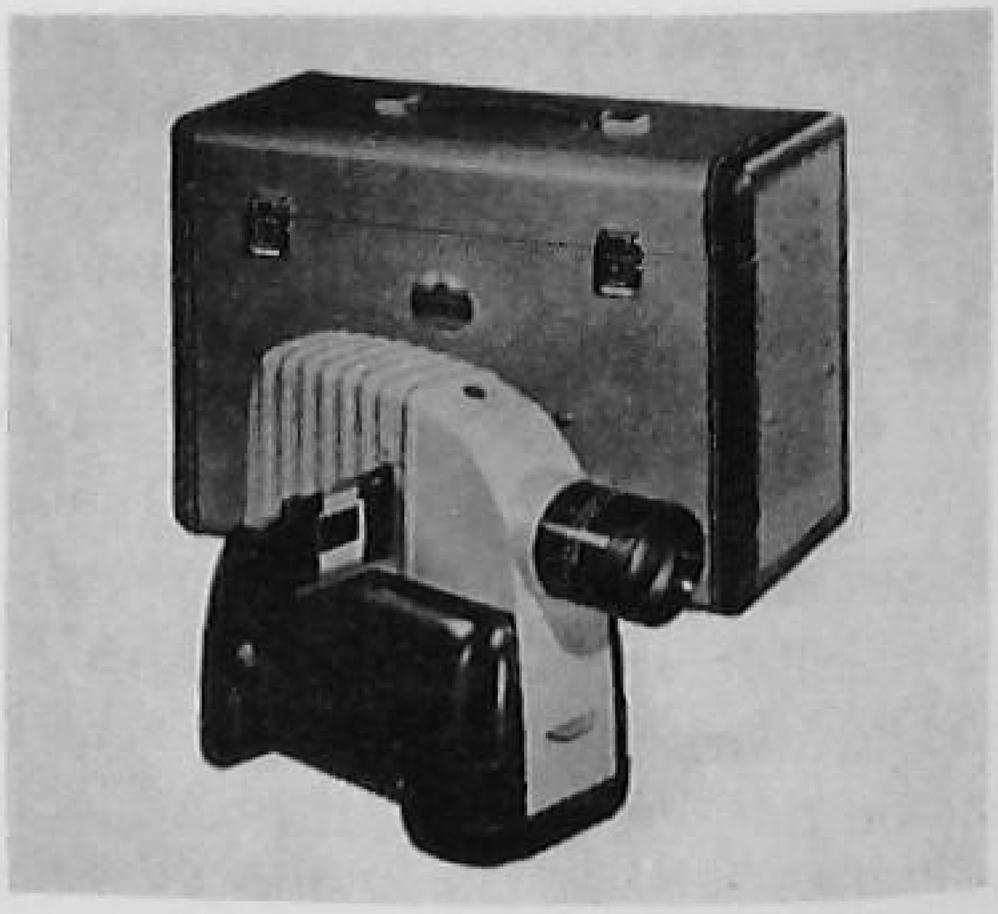


Viewlex Venturi Projector.

Schoolmaster "300" with semi-automatic slide changer.



Kodaslide Table Viewer, Model A.

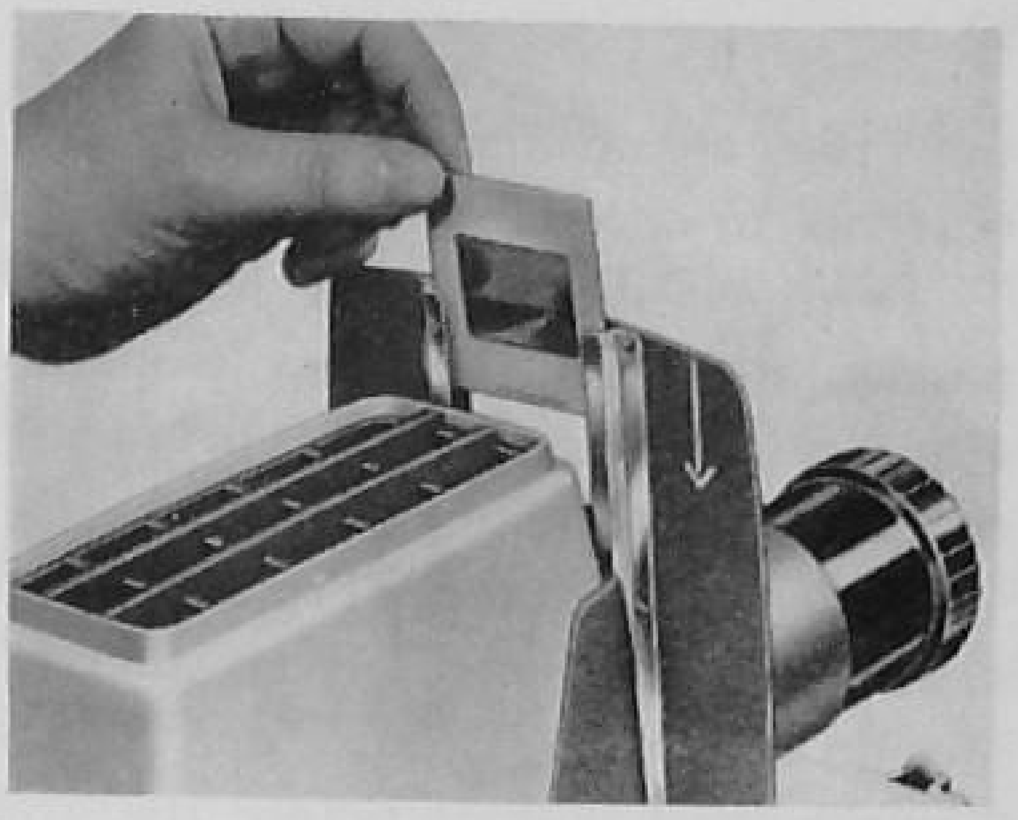


Kodaslide Projector, Master Model.

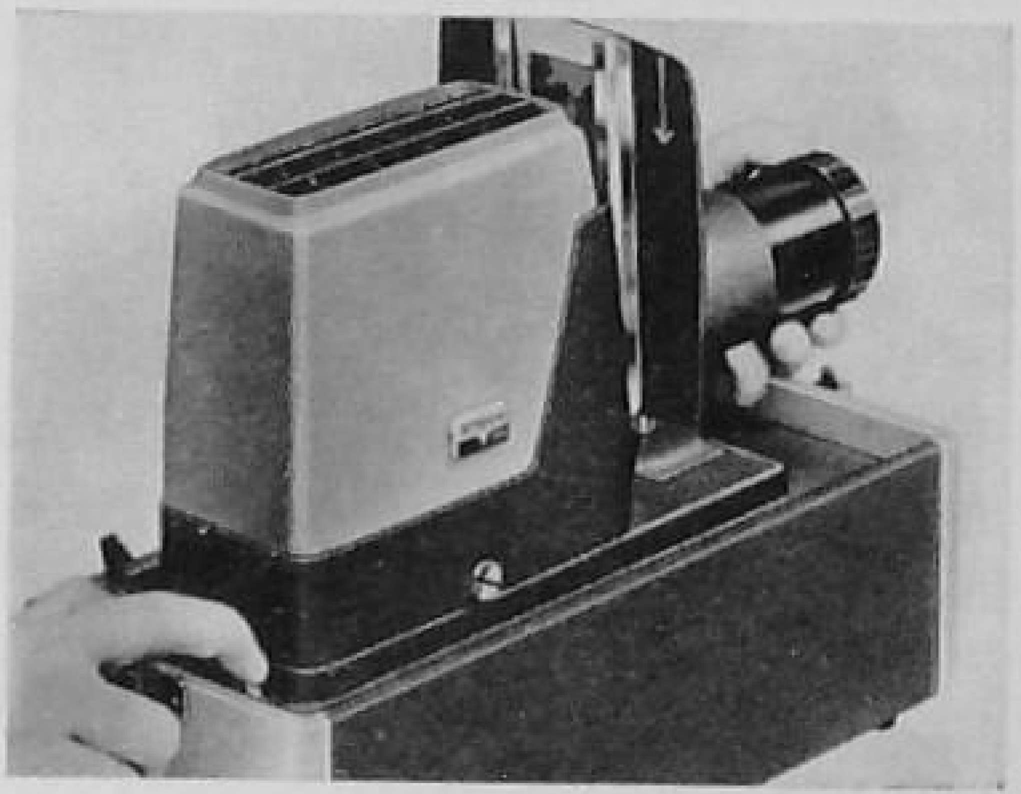
Popular 2" X 2" slide projectors used in classroom instruction. (Courtesy Eastman Kodak Co., Viewlex, Inc., and S.V.E.)

SUGGESTIONS FOR OPERATING ARGUS "350" SLIDE PROJECTOR

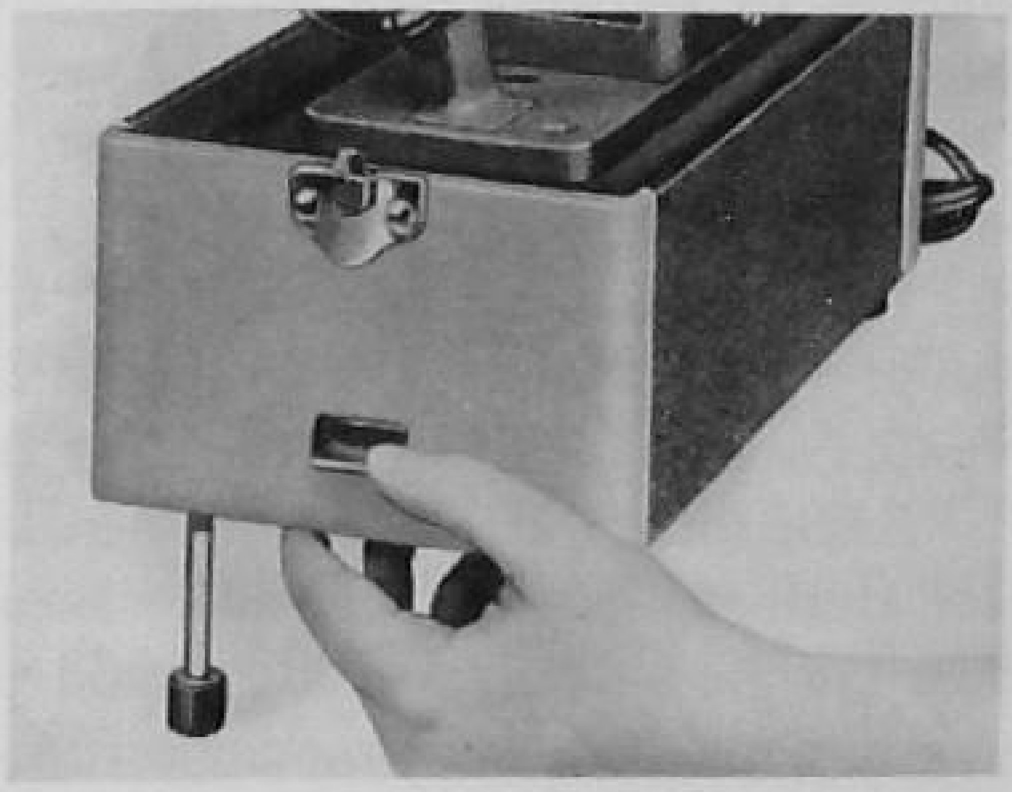
Blower starts cooling automatically when projector is plugged into electrical outlet. Slides are inserted in Rotary Carrier right-side-up—the way you look at them, white side facing rear. To bring the slide into projecting position, rotate slide carrier clockwise a half turn in the direction of arrow.



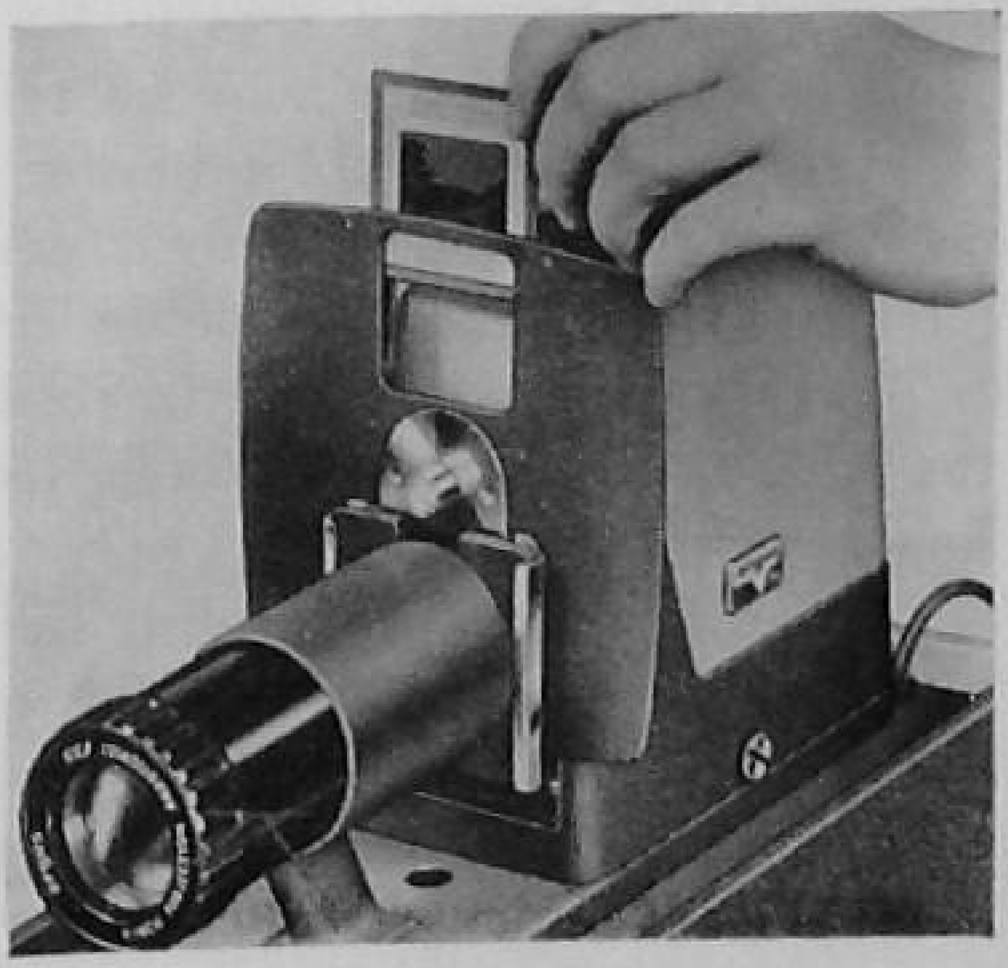
The switch for turning on the projector lamp is conveniently placed at the rear of the projector. By sliding the lens barrel, the picture is brought into sharp focus. Use a twisting motion for smooth and rapid operation.



To raise or lower projector squeeze Tilt Adjustment Lever in front of projector as shown. Release pressure at desired height and legs will automatically retain position.



Insert second slide and again rotate slide carrier in direction of arrow. First slide will eject partially for convenience in removing. Always set projector on a flat hard surface resting on its feet so that air passes freely under the projector at all times.



dow like an ordinary ventilator, and this arrangement will permit air currents to enter the room but will keep light out.

During warm weather learning is retarded by a hot, stuffy room, particularly when the room temperature rises above 72° or the humidity above 50 per cent. By all means use a small air-conditioning unit or an ordinary electric fan.

7. *Test projector.* Project a slide on the screen and check it for clarity and centering. Even though a slide projector is simple to operate, do not attempt to use one that is unfamiliar to you unless you have experimented with it before the group convenes. If necessary, secure someone who can operate it. You will find it very valuable to teach a selected group of students to operate the projector. This will permit the instructor to devote his full time to the projected slide, class discussion, and problem.

You are now ready for your class.

Presenting the slide. The haphazard exhibition of a set of slides results in ineffectual instruction. Each instructor should develop an effective plan. The following procedure has proved successful:

1. *Prepare students.* After the class is put at ease, the instructor should briefly state the problem to be solved. Arouse the student's interest by showing how an understanding of the lesson will materially benefit him. Point out what he should look for during the presentation and, finally, inform the student that he will be tested at the completion of the showing.

2. *Present slides and instructions.* The slides and instructions should be presented one step at a time in a logical and orderly fashion. Best results are obtained by proceeding from the known to the unknown.

Each slide should be projected long enough to allow sufficient time for study and comprehension. Because of the heat generated by the lamp, a glass-mounted slide should not be projected more than seven to ten minutes. A ready-mount cardboard slide may be damaged and can become a fire hazard if kept in the projector more than two or three minutes. This situation may be relieved to some extent by use of a projector equipped with a blower or other cooling device. Shorter periods of time should be used when presenting colored slides, since these have a tendency to fade under a continuous bright light.

Using a pointer to focus the student's attention to a specific item on the slide is much more effective than pointing to the item with your finger.

Remember, there is a limit to the amount of knowledge a person can retain. Present no more than the student can master at one time.

3. *Apply the information.* Immediately after the slides and information have been presented, the student should perform the job and explain

each step in the operation. If the instruction consists of teaching a specific manipulative skill, pupil performance of the task is imperative at this time. The instructor should insist on correct timing and the proper use of technical terms.

Factual information or attitude teaching may be assimilated in a vitalized group discussion.

4. *Test student.* The student's understanding of the lesson should be thoroughly tested by the instructor. Check the student's timing, accuracy, and speed of performance, and carefully note errors. The test can be oral or written, but it should be brief, specific, and to the point. Objective examinations of the true-false, multiple choice, matching, or completion type have the edge on the more cumbersome and lengthy subjective examinations. The quiz card, mentioned in Chapter 1, has proved successful; it is a simple card that can be answered by merely punching a hole or putting a mark in the proper place.

5. *Review the lesson.* All errors which were discovered during testing should be corrected and retaught. The instructor should not hesitate to show the teaching slides again. Only those which pertain to the students' specific weaknesses or errors need be repeated. Remember, *if the student has not learned—the instructor has not taught.*

How to Operate Slide Projectors

Types of machines. The standard 3¼ by 4-inch slides and the newer 2 by 2-inch Kodachrome and black-and-white slides may be projected by a large variety of different machines. The trend in manufacturing is to combine multiple operations in one instrument, such as the S. V. E. Tri-Purpose Projector,[1] the Bausch & Lomb Combined Balopticon,[2] and the Spencer Combination Delineascope.[3] Some of these models not only act as an opaque projector, but also can handle the 2 by 2-inch and 3¼ by 4-inch slides, slidefilms, and microslides.

Although the principles of operation of each machine are similar, the instructions which accompany the projector should be carefully followed step by step: remember the manufacturer knows more about his machine than you do. Make three copies of the directions, and if possible, paste one copy in the projector case, paste another on a heavy piece of cardboard and hang it in the equipment cabinet, and place the third copy in your lesson plan manual. The original may be placed in your file.

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[1] For illustrated catalogue, write to Society for Visual Education, Inc., Chicago, Ill.

[2] For illustrated catalogue, write to Bausch & Lomb Optical Company, Rochester, N. Y.

[3] For illustrated catalogue, write to American Optical Company, Buffalo, N. Y.

Operation of the standard lantern slide projector

1. Carefully remove the projector from its case, and place it on a table or any other stable object.

2. Insert projector plug in electric outlet.

3. Adjust screen in front of projector.

4. Insert slide carrier in its holder. Check it for centering and secure it by tightening set screw.

5. Carefully pull forward the tubes beneath the bellows two thirds their length and make them secure by tightening set screws.

6. From a position in the rear of the projector, place a test slide in the right-hand side of the carrier and gently push the frame over to the center.

7. Turn on projector light.

8. Make image clear on screen by slowly pulling the focusing rods forward or backward. Secure them by tightening set screws.

9. Focus image critically sharp on screen by turning the objective lens backward or forward.

10. If necessary, straighten image on screen by loosening the wing nut under projector, tilting the machine, and tightening the wing nut.

11. To change the height of the image on the screen, adjust wing nut at the base of the projector.

12. Place slides in tray (to prevent sliding off table) on the right-hand side of projector, arranged in the correct order with all thumb marks in upper right-hand corner.

13. If necessary, open lamp house flap to permit light to fall on notes.

14. Present slides smoothly. Remove glare by placing your hand or a card over the lens while changing slides.

15. After showing, place projector in case by reversing the procedure, and return projector to storage.

Operation of the Eastman Kodaslide Projector (Model I)

1. Place projector on table or any other steady support.

2. Set up screen in front of projector.

3. Insert electric plug in outlet and switch on the lamp.

4. Standing in back of projector, insert test slide in opening on the right-hand side.

5. Center the image and focus it on the screen by slowly turning the lens barrel left or right.

6. Place slides in proper order on right-hand side of projector with thumb marks in the upper right-hand corner. Keep them in a tray or box to prevent them from sliding off the table.

7. Have the thumb mark in the upper right-hand corner as you insert the slide.

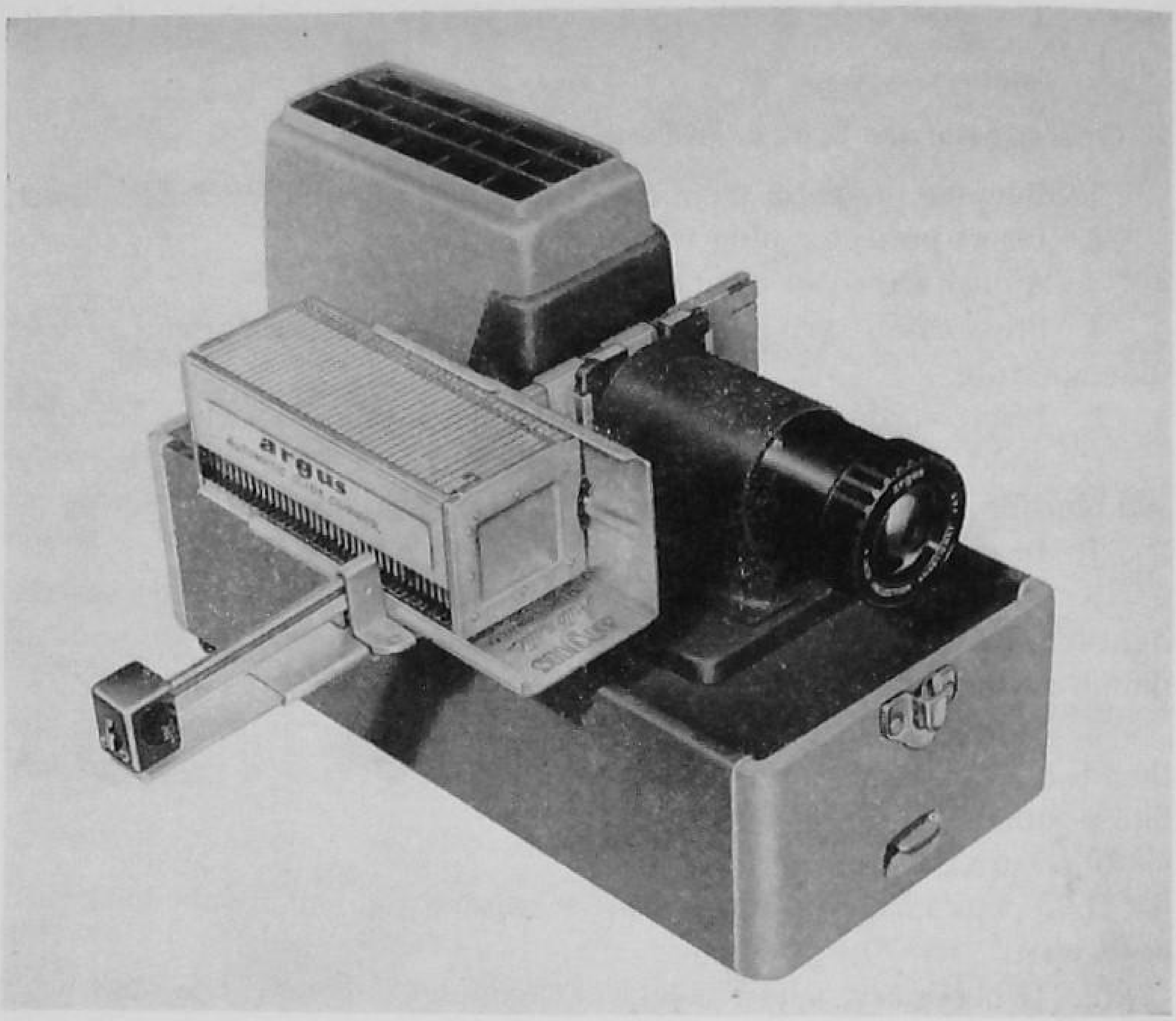
8. The new slide gently pushes out the previous slide on the left-hand side.

Operation of the S. V. E. Tri-Purpose Projector

1. Remove projector from case, and place on table or stable object.
2. Insert projector plug in outlet.
3. Adjust screen in front of projector.
4. Press catch spring to open barrel, loosen set screw, and remove slide aperture.
5. Insert vertical slide carrier in correct position and close barrel.
6. Hold projector firmly with left hand and turn the lens barrel and housing with the right hand until it assumes a horizontal position.
7. Insert lens mount into the barrel.
8. Place slides in tray (to prevent sliding off the table) on the right-hand side of the projector, arranged in the correct order with all thumb marks in the upper right-hand corner.
9. Standing behind the projector, insert test slide in carrier with the thumb marks in upper right-hand corner facing you, and push the slide into position.
10. Turn on projector light.
11. Focus image on the screen by turning the lens mount backward or forward.
12. If necessary, adjust height of image on screen with control lever at the bottom of projector on the right-hand side.
13. Inserting the next slide or pushing the empty frame into position will automatically return the previous slide.
14. Present slides smoothly.
15. After showing, place projector in case by reversing procedure and return it to storage.

"Automatic" slide projection. When a series of 2 by 2-inch slides are to be exhibited to a group, it is convenient to use an "automatic" projector such as the Golde Nu-Manumatic Slide Projector, the Selectroslide, the Airequipt Automatic Slide Changer, the Argus Automatic Slide Changer, or the Kodaslide Ready-Mount Changer. This equipment makes it possible to insert 20 to 50 slides in a carrier, and then to feed them automatically into the projector by means of a cable release or a remote push-button control. The Kodaslide Changer is especially designed for paper slides and will not handle glass slides. For most satisfactory results, carefully follow the instructions which accompany the projector.

Faxfilm slide projection. Faxfilm provides a simple and economical method for reproducing surface finishes and contours in the third dimension. Surface roughness, waviness, grains, cleavages, cracks, porosity,



Argus

Argus Automatic Slide Changer.

dents, and scratches may be enlarged 10,000 times, or 100 diameters, by projecting a Faxfilm slide in any 2 by 2-inch slide projector. If the slide is carefully made, it will show details of the finest irregularities up to 0.0001 of an inch.

A Faxfilm slide can be prepared in a few minutes, simply by moistening the surface of the specimen with Faxfilm solution and carefully placing an inch piece of Faxfilm plastic ribbon on it. After drying, it is peeled from the surface of the specimen and placed in a 2 by 2-inch cardboard frame, ready for projection. A kit containing material for 250 slides may be purchased for approximately $15.00. Sources are listed in Appendix 2.

Flashmeter slide projection. The Flashmeter makes it possible to flash words, phrases, sentences, or pictures on a screen for definite time periods, ranging from 1/75 of a second to a full second. It is especially applicable in diagnostic and remedial procedures in reading, speech, spelling, arithmetic, and recognition training. The Keystone View Company has developed a large variety of slides suitable for use with the Flashmeter. However, an instructor can also prepare his own simple

To attach the changer (see Fig. 1), take a position behind your projector, holding the changer with its operating handle to your right and the mounting rails facing away from you. Engage the mounting rails over the two sides of the square mounting bracket on the projector, and slide the changer down until the stop-lugs at the top come to rest.

Your slides are easily loaded into their individual metal frames while the magazine is removed from the changer. Lay the magazine down with the Argus name plate on the bottom, and with the index card on the right-hand side (see Fig. 2). In this position all of the open ends of the individual frames will be exposed on top.

Without removing the metal frames from the magazine, insert a slide in each frame with the picture tipped on its side, bottom toward the index card and emulsion side (dull side) facing away from you (Fig. 3). Follow this procedure carefully and your slides will never be projected upside-down or backwards. Push each slide all the way in until caught behind the "lip" on the edge of the frame. Enter your index data on the card as you load your magazines or as you project each series the first time.

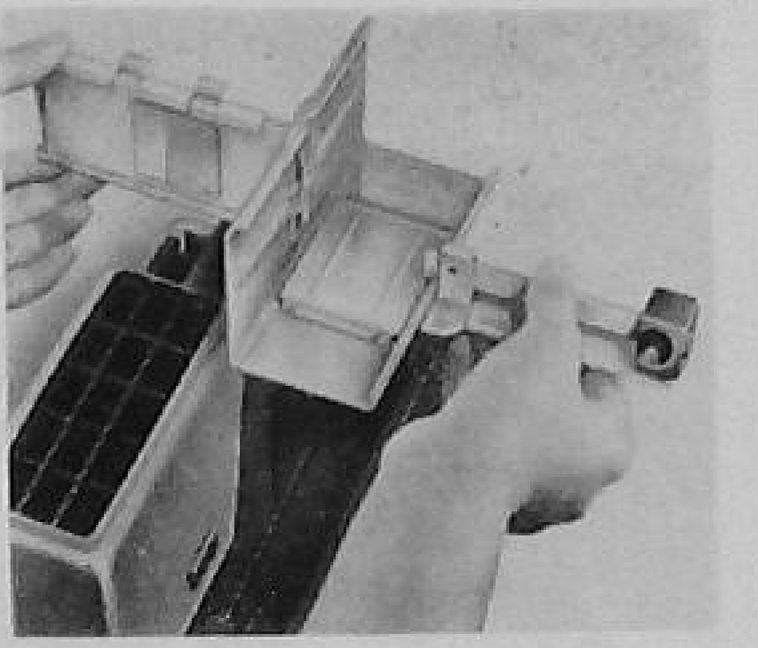
The frames will correctly accommodate any type of standard 2" X 2" mount which is not more than $\frac{3}{32}$" in thickness—paper, glass or plastic. Additional magazines, in self-storing individual boxes with "see-thru" covers, are available from your Argus dealer.

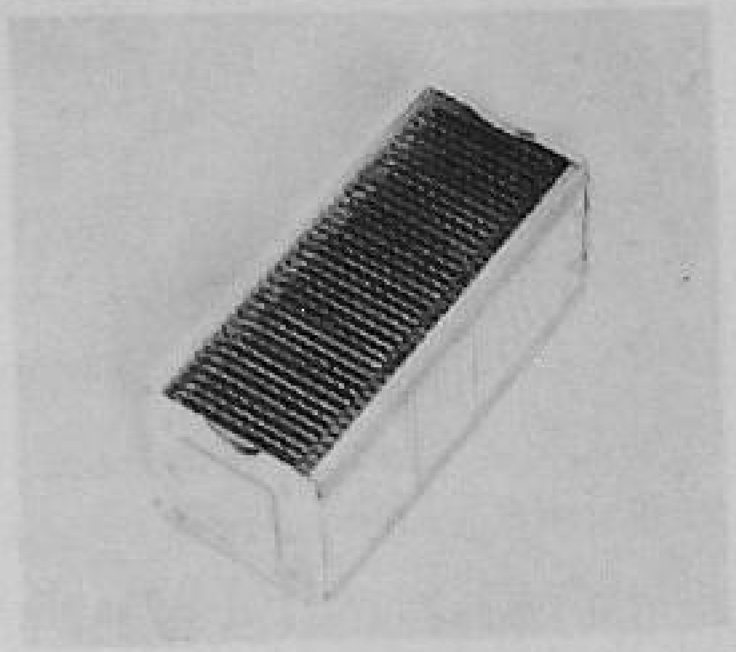
Pull the operating handle all the way out. Insert a loaded magazine from the rear with its index card up and its Argus name plate to your right. Be sure you insert it under the rail at the top edge of the vertical guide plate on the changer (see Fig. 4). Slide the magazine forward until it engages the ratchet device which controls its automatic forward movement. Now slide the magazine forward or backward until No. 1 on the index card is opposite the indexing notch in the top guide rail (see Fig. 5). The changer is then ready for automatic projection.

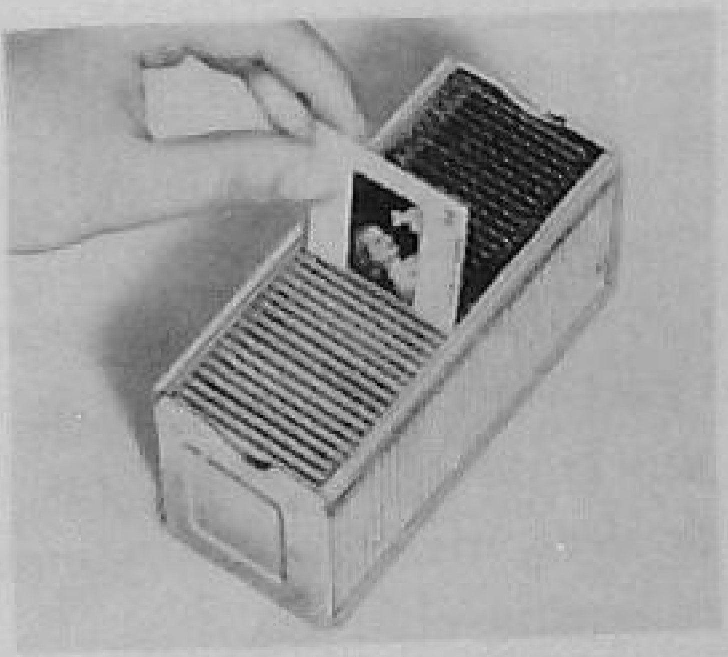
To project your slides, simply push the operating handle to the left as far as it will go. This inward motion selects each frame and moves it into position for viewing. Pulling the operating handle out to the right as far as it will go returns the slide to the magazine and advances the next one into position for the inward stroke.

You may show all the slides in a magazine in sequence automatically by repeating the push-pull movement of the handle. Or if you prefer, when the handle is all the way out to the right, you may manually slide the magazine forward or back to skip or repeat any number of slides.

When the last slide in the magazine has been shown, the operating handle cannot be moved again. Slide the magazine forward and off the changer and insert another in the manner described.


1


2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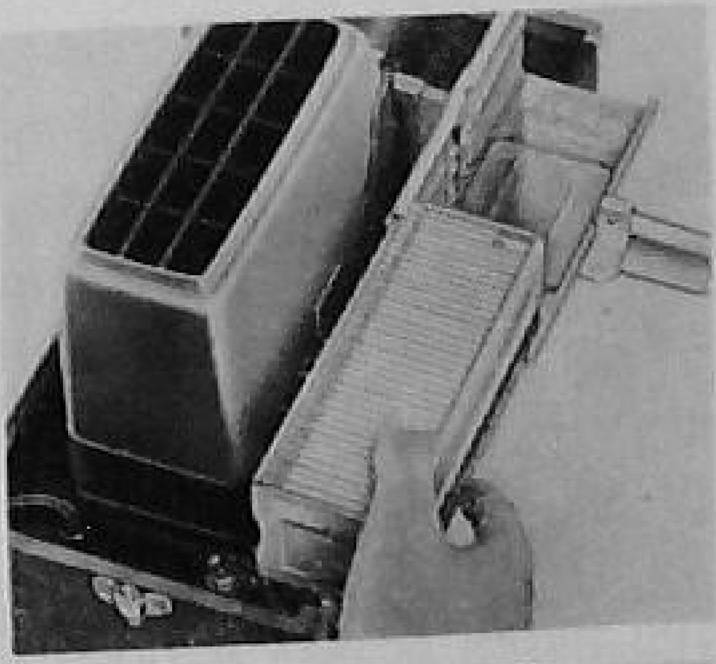
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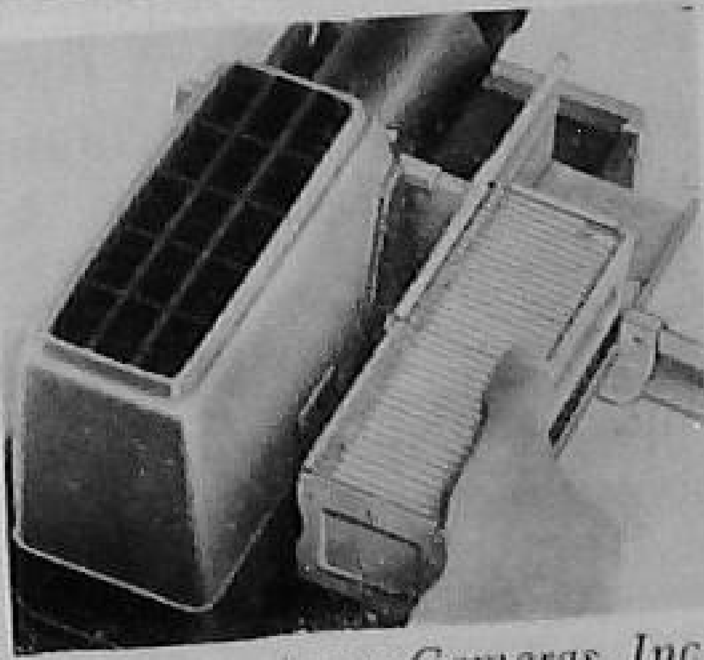
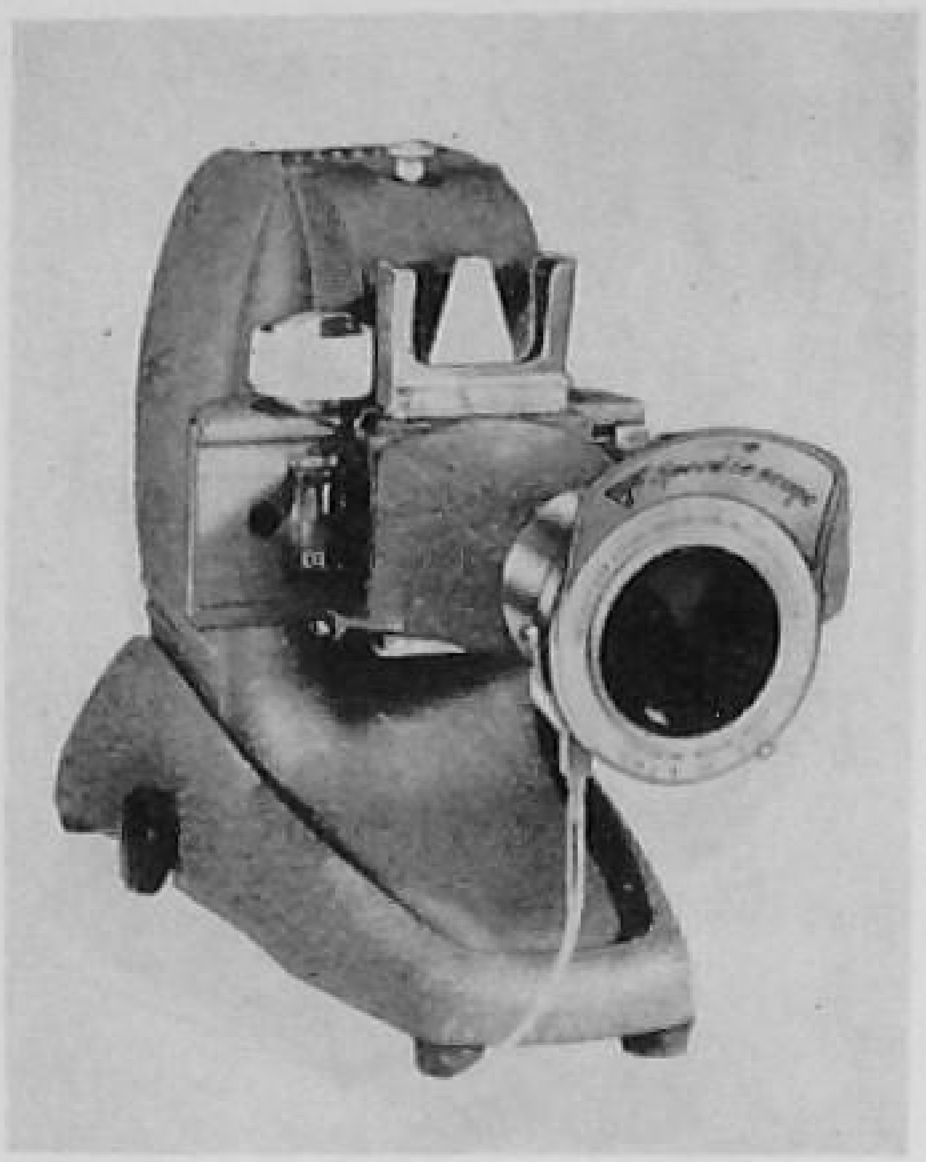

5

Courtesy Argus Cameras, Inc.


S.V.E.

The Speed-i-o-scope in the S.V.E. Instructor "300."

slides for use in specific training jobs. The Flashmeter unit can be attached to the lens barrel of an ordinary standard lantern projector.

The Society for Visual Education has also developed similar equipment, the Speed-i-o-scope and the Tach-Adapter, and a fairly complete series of instructional materials for the improvement of reading and mathematical abilities.

Micro-slide projection. By using a simple microprojector, like that developed by the Bausch & Lomb Company, or the S. V. E. Micro-Beam Attachment, it is possible to project a large variety of microscopic slides with a magnification of 120 diameters at 20 feet or 180 diameters at 30 feet. Many students in chemistry, physics, and other science classes have difficulty in studying a slide under a microscope. However, with the use of a micro-slide projector, the instructor is able clearly to show the entire group exactly what to look for in the slide. The micro-projector unit fastens to the front of a projection lens and microscopic slides of fibers, textiles, flowers, insects, plant stems, and other subjects are held in place by a set of spring clamps.

Investigation of stress and strain on fibers and filaments, surface tension phenomena in aqueous and other solutions, crystal growth in solutions, the details of fingerprints, and numerous other items may be adequately facilitated by the use of microprojection.

The Rayoscope, a relatively inexpensive microprojector, now has an attachment that simplifies the tracing procedure and enables students to make highly magnified drawings of specimens in chemistry, biology, physics, and other science classes. Light transmitted through the tracing paper makes it possible to reproduce fine details without darkening the room. A roll of tracing paper or transparent plastic can be used for tracing serial or continuous sections for a complete lesson or unit.

Miscellaneous hints. A good instructor will make certain that there is sufficient extension cord, plugs, and an extra projector lamp. If you are using an assistant, arrange a simple signal system with him. The more professional you make your presentation the more effectively will you be able to instruct.

Projectors are delicate instruments, requiring occasional repairs and replacements, and continual oiling and cleaning. Follow the manufac-

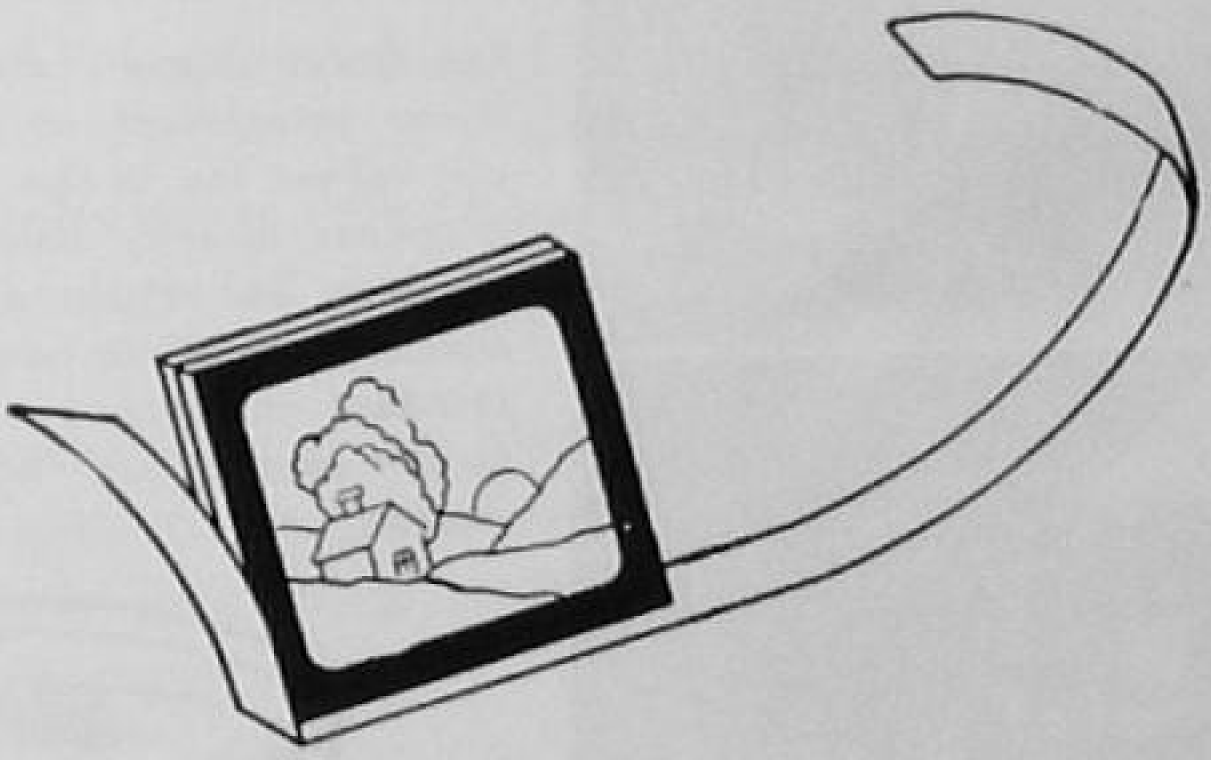
turer's instruction. Take care of your projector and it will not let you down.

How to Make Slides

The standard 3¼ by 4-inch slide. Slides can be made with (1) cellophane, (2) etched glass, (3) plain glass, (4) lumarith, (5) silhouettes, and (6) photographic prints. Most of this material may be purchased in your local photography and stationery stores.

Only the preparation of the photographic slide requires special ability, and unless you have access to a darkroom and have tinkered with photographic development, it would be advisable, and less expensive, to borrow, rent, or purchase these slides from reliable sources listed in Appendix 2. For complete information on how to prepare photographic slides, use the "Kodak Data Book on Slides."[4]

The other teaching slides are easy to make. Constructing slides is excellent practice for the learner, but the time allowed for this task should be budgeted. The instructor will find it extremely valuable himself to prepare the slides that accompany his lessons.



Binding slides. All permanent slides should be made with two pieces of glass, held tightly together with binding tape. A roll of standard binding tape for fifty slides may be purchased for approximately twenty cents. Ordinary scotch tape may also be used. Follow these directions for binding slides:

1. Cut off 15 inches of binding tape.
2. Place tape upon a flat surface with adhesive side on top.
3. Moisten tape (if necessary).
4. Holding the two pieces of glass firmly with all edges even, set one side in the center of the tape, starting at one end.

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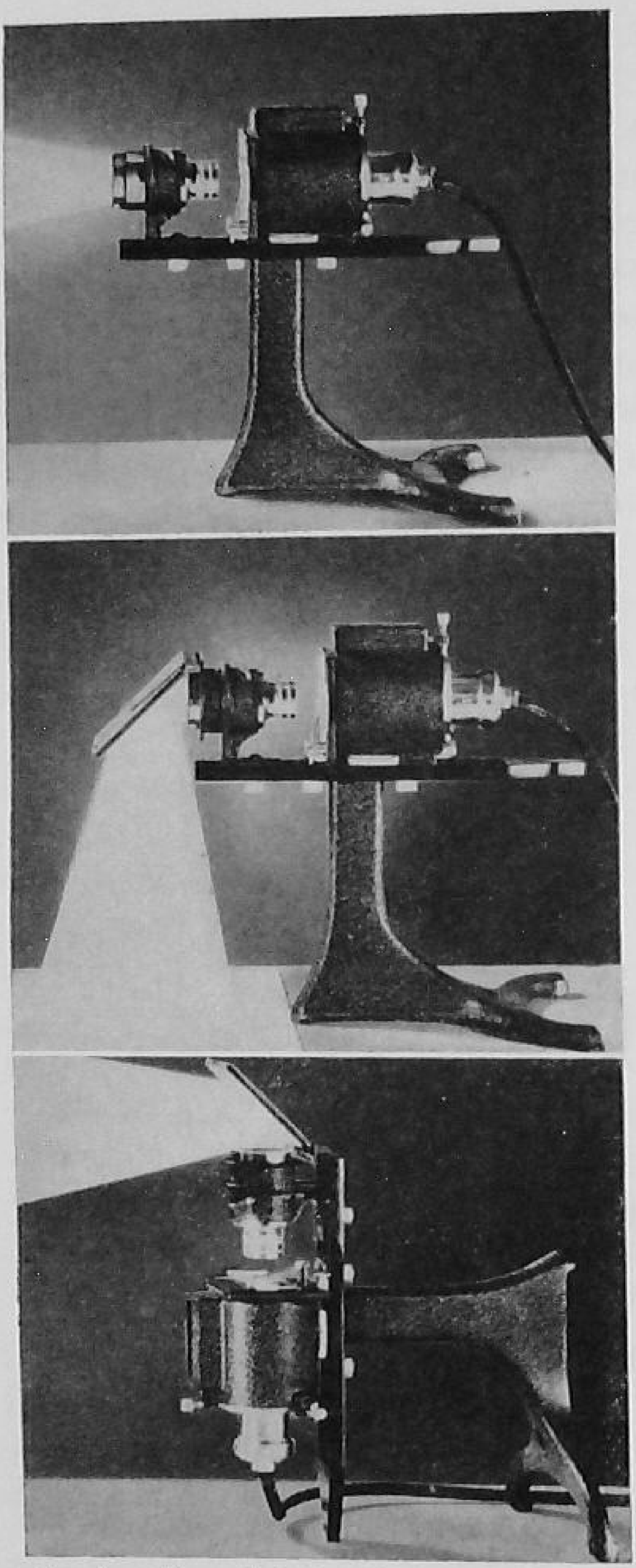
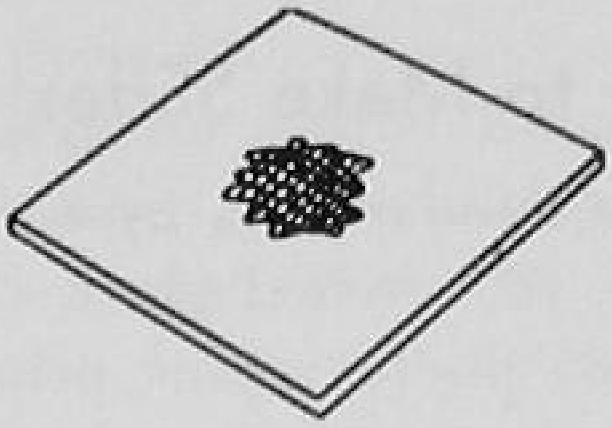
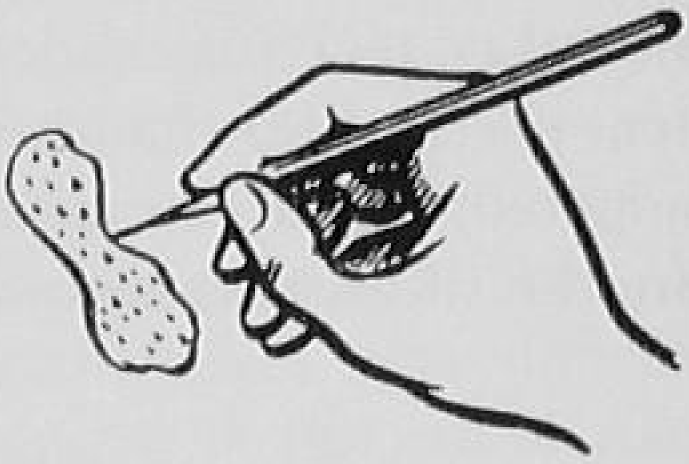
[4] Published by Eastman Kodak Company, Rochester, N. Y. Available at most local photography stores.



Courtesy Bausch & Lomb Optical Co.



For Permanently Mounted Specimens: A microprojector can handle a wide range of regular material with ample reserve resolution and covering power for higher and lower magnifications. With divisible objective, range of magnification is from 30X to 230X, at screen distance of 4 to 15 feet.



For Drawing and Table Projection: A mirror attachment on a microprojector can reflect the image onto a notebook or paper directly below it. The image is clear and sharp for easy tracing. Divisible objectives can be removed and standard microscope objectives used, if larger images and higher powers are desired.

For Specimens in Liquid: The whole class can view a living specimen at one time. Special air-space insulation in the objective stage makes it possible to observe living material for long periods.

Micro-slide projection.

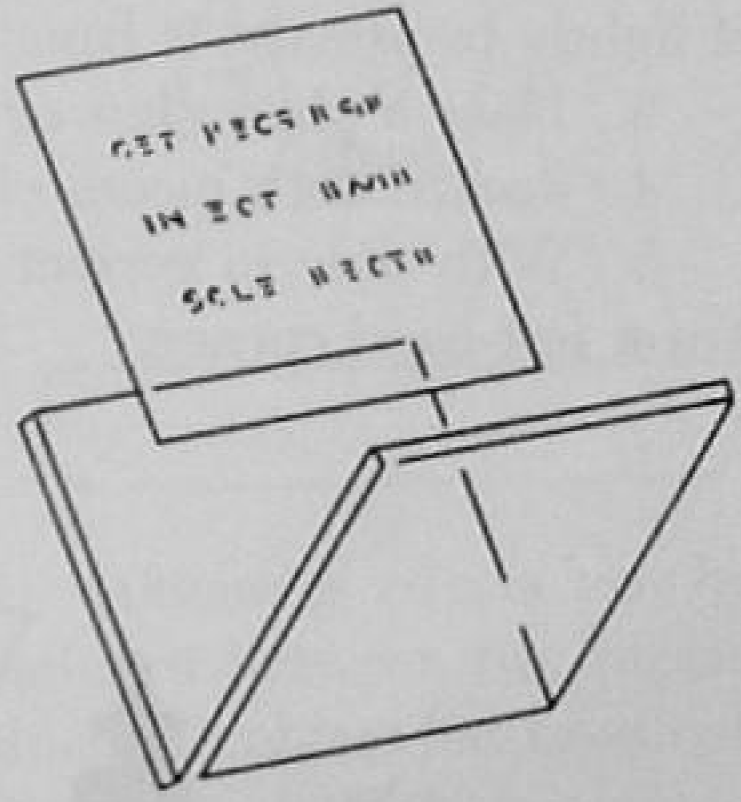
5. With firm pressure, roll the slide along the tape until all edges are covered.

6. Press down the edges of the tape on both sides of the glass.

7. Make corners even by folding one side under and the other side over.

Cellophane slides. The material required to make this type of slide consists of:

(1) A 3½ by 4-inch sheet of plain or colored cellophane.
(2) A 6½ by 8-inch sheet of carbon paper.
(3) Two pieces of 3¼ by 4-inch cover glass.
(4) 15 inches of binding tape.
(5) A typewriter.



Before starting your good copy, lay out the slide on a 3¼ by 4-inch piece of scrap paper. Be sure to leave a ½-inch margin on all sides. Follow these steps:

1. Fold sheet of carbon in half, and place cellophane in center.

2. Insert carbon and cellophane in typewriter and adjust machine for stencil position.

3. Type material on cellophane through the carbon. Using a ½-inch margin, you can have 13 single-space lines with approximately 33 spaces to a line.

4. Remove cellophane and place it between two pieces of cover glass.

5. Secure glass covers with binding tape.

6. With slide in correct reading position, place a thumb mark in lower left-hand corner.

If a Radio-Mat slide or a similar slide is used, it is merely necessary to insert it in the typewriter, mat side toward the operator, and after completion, remove the envelope back and the carbon sheet. The 3¼ by 4-inch slides may be purchased for approximately $1.50 per 100 and the 2 by 2½-inch slides cost approximately $2.00 per 100.

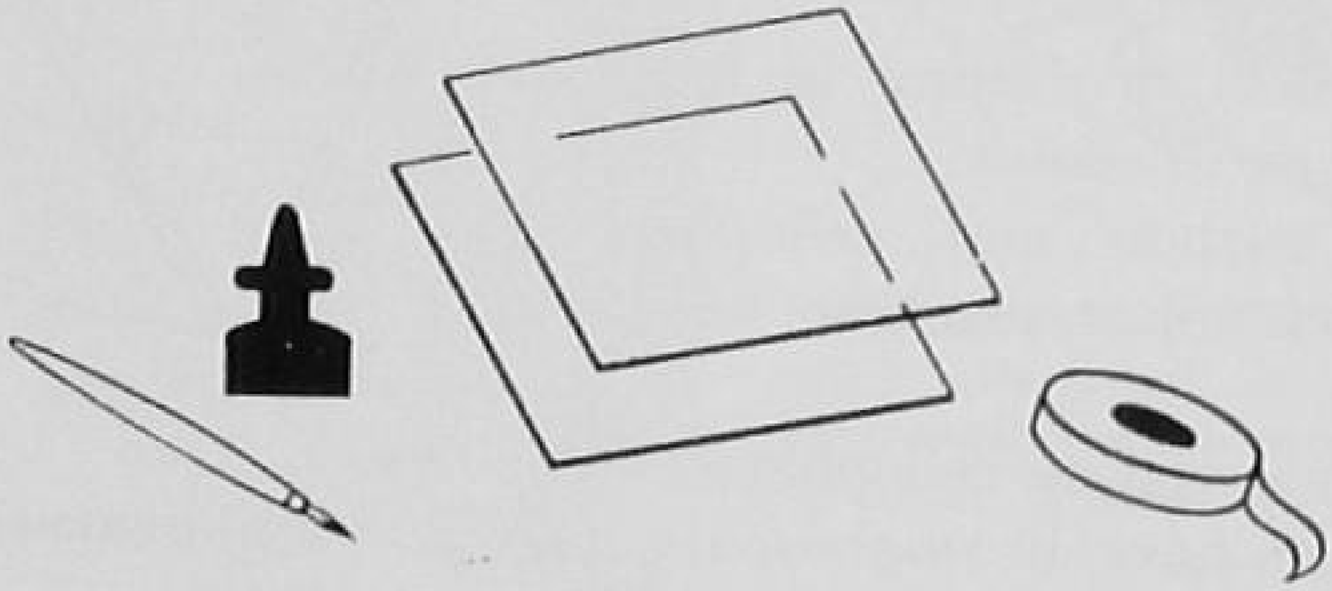
Instead of using a typewriter, you can write on the cellophane through the carbon with a stylus. India ink may be applied directly to the cellophane with a fine or medium pen, in which case it is suggested that you place the cellophane over the drawing or sketch, and merely trace it on the transparency.

Etched glass slides. Etched glass used for this purpose is nothing more than a fine piece of glass with a roughened surface that will readily take India ink, colored slide inks and pencils, slide crayons, and the

ordinary lead pencil. You may purchase 3¼ by 4-inch pieces of etched glass for approximately ten cents each.

The necessary material to construct this slide consists of (1) one piece of 3¼ by 4-inch etched glass, (2) one piece of 3¼ by 4-inch plain glass cover, (3) colored slide pencil, and (4) 15 inches of binding tape. If you use ink, experiment with pens until you find the point and position that suits you best. Follow these steps:

1. Prepare material on a 3¼ by 4-inch sheet of paper, leaving a half-inch margin on all sides.
2. Place the etched glass over the sheet of paper, and trace the material on the roughened surface with colored pencil. If ink is used, apply it lightly to prevent it from cracking when it dries.
3. Place a plain glass cover over the etched glass.
4. Secure both pieces of glass with binding tape.
5. With slide in correct reading position, place a thumb mark in the lower left-hand corner.



Slight errors on a slide become greatly magnified when projected on a screen. Lead-pencil markings may be removed with art gum. "Ketch" will remove colored crayon and pencil marks, and a slide ink solvent will remove ink markings. If the finished slide is not satisfactory, do not discard it, but clean the surface and start over again. To remove crayon and pencil material, use soap cleanser and water.

Plain glass slides. To prepare these slides you need (1) two pieces of 3¼ by 4-inch cover glass, (2) India ink, (3) pen, and (4) 15 inches of binding tape. Good cover glasses may be purchased for approximately two and one-half cents each. However, it is necessary to clean the surface thoroughly before the cover glasses will take India ink. Cleaning fluid, alcohol, carbon tetrachloride, or soap and water, will be satisfactory. Use a linen cloth or a chamois for drying the slide.

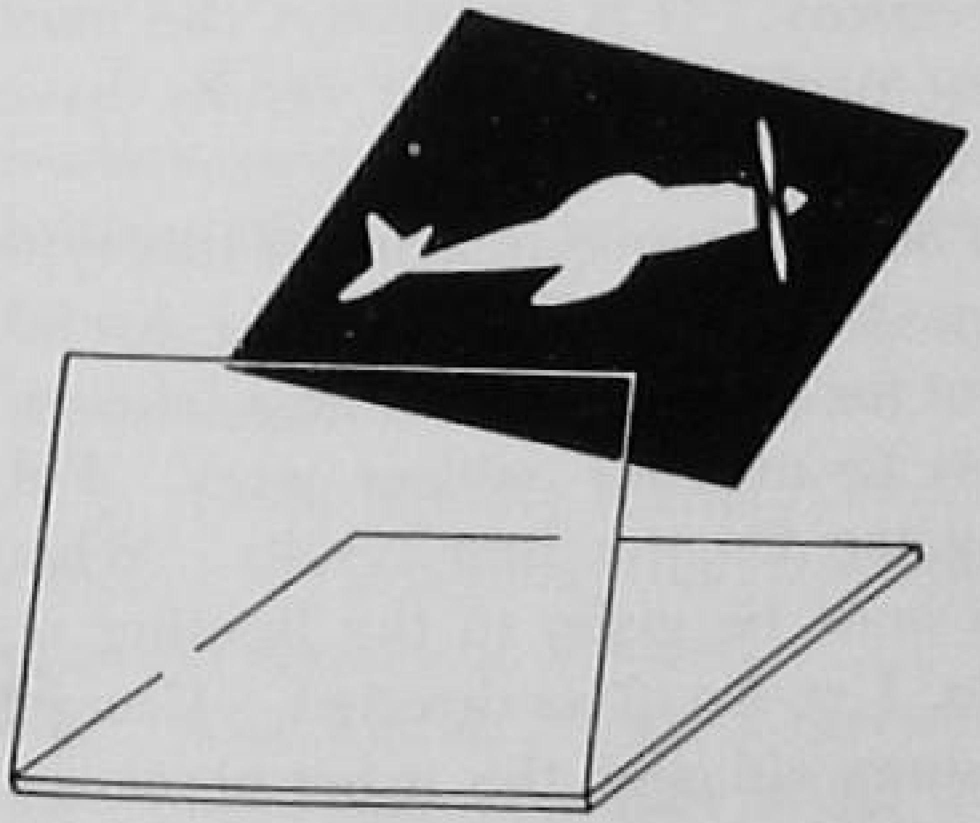
Other methods of preparing the slide to take colored ink and pencil as well as India ink are to (1) paint surface with a light coat of clear shellac, (2) cover surface with a solution of one-quarter teaspoon of gelatin or glue dissolved in one ounce of hot water, or (3) place slide in "hypo" solution and wash in water for three or four minutes. Cover

glasses thus treated must be allowed to dry in a place free from dust.

After one glass cover is prepared, follow the same procedure suggested for an etched glass slide.

Lumarith slides. This safety celluloid is made in clear and etched sheets, usually 20 by 50 inches. The economy of lumarith has contributed greatly to its widespread use. A sheet will yield approximately seventy-five 3¼ by 4-inch pieces.[5] The clear celluloid takes the place of plain glass, and the etched lumarith may be used instead of etched glass. Follow the same procedure in preparing lumarith slides that you do in making plain glass and etched slides. To make your slide completely permanent, insert celluloid between two pieces of cover glass, as you do with cellophane.

Silhouette slides. These slides are popular with youngsters in elementary schools; nevertheless they can be valuable in other kinds of instruction, especially in subjects where the effect of size or area is important. Silhouette effects can be made either by cutting out an object and placing it between two pieces of cover glass or by placing the paper from which the object has been cut between the glass covers. Using colored cellophane with these cutouts will produce interesting results.



Slidecraft slides. These plastic slides may be penciled, inked, crayoned, printed, or typed. They are extremely light in weight (several hundred weigh only a few ounces) and are available in both 3¼ by 4-inch and 2 by 2-inch sizes. In preparing a Slidecraft slide it is suggested that it be placed over a drawing or picture approximately 3¼ by 4 inches in size (with "TOP" at the upper left-hand corner) and traced with a pencil or opaque ink. It may then be colored with Slidecraft crayons or any suitable coloring agent. When this work is completed the slide may be placed in the projector with the "star" in the upper right-hand corner.

When typing on Slidecraft slides many typewriter ribbons do not leave an opaque image. Under such circumstances it is recommended

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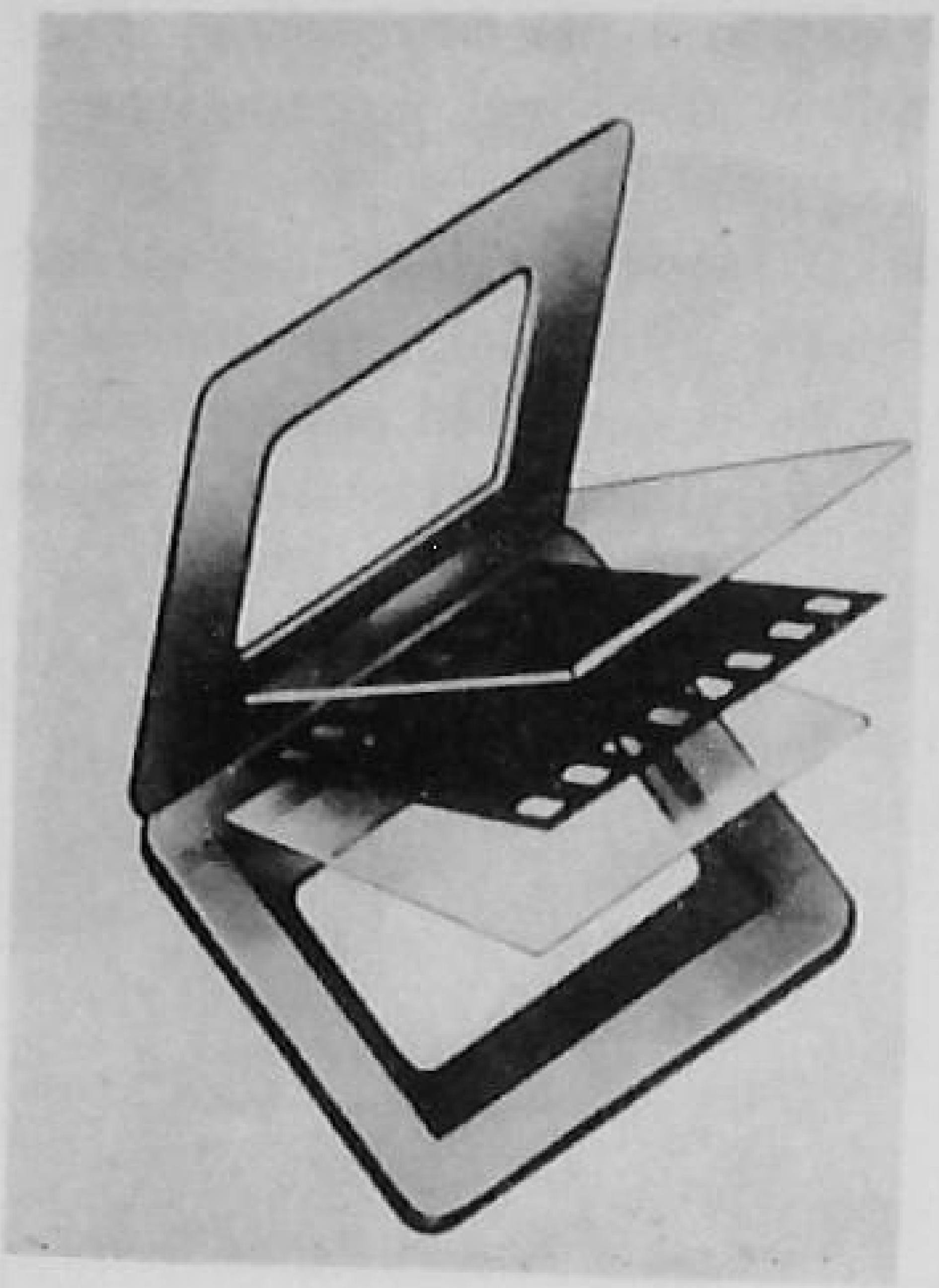
[5] Celluloid Corporation, Newark, N. J.



S.V.E.

Slide binders protect your transparencies.

that the slide be placed within a folded piece of good carbon paper before rolling it into the typewriter. After the message has been typed, remove the carbon paper and the slide is ready to use.

Slidecraft slides and other slide making materials may be obtained from the Slidecraft Company, 257 Audley Street, South Orange, N. J.

2 by 2-inch slides. These slides are playing an important role in all areas of teaching chiefly because they can be made to pertain to specific things. Secondly, the ease with which these slides can be prepared makes it possible for any instructor or student to produce excellent slides with a little practice. Thirdly, they are inexpensive.

The cost includes processing and they are returned to you mounted in slide form. The price of film is usually much less when purchased in larger quantities.

A 35-mm. or bantam camera, such as the Argus, Contax, Eastman, Exakta, Leica, Welti, and Zeiss, is necessary. It is not always the most expensive camera that takes the best picture. Excellent results have been obtained with inexpensive cameras.

Black-and-white slides. Indoor and outdoor transparencies of this type are made with black-and-white film. A "faster" film, such as Kodak Super-XX or Kodak Plus-X, is excellent for indoor work, while a "slower" film, such as Kodak Panatomic-X, may be used for outdoor work. Follow the directions which accompany the film for best results. When doing indoor work, special attention must be given to the lighting requirements: use photoflood lamps No. 1 or No. 2 as directed. Using a light meter will assure accurate exposures, although this is not necessary. After exposing and developing ordinary black-and-white film, select the negatives which you want converted to positives for slide use. Kodak Direct Positive Panchromatic Film, when exposed in a camera, will yield a direct positive for the slide instead of the usual negative.

Kodachrome (colored) slides. The natural color of both outdoor and indoor settings is captured with 35-mm. Kodachrome film. Regular Kodachrome-K135 is used for outdoor scenes, while Type A, Kodachrome-K135a is used for indoor work and may be used outdoors if a type A Kodachrome Filter for Daylight is attached to the camera. For

satisfactory results, follow the directions which accompany the film. Proper lighting is of utmost importance in colored photography, especially when doing indoor work with artificial light. Ordinary photoflood lamps No. 1 and No. 2 or photoflash illumination should be used instead of blue bulbs or arc lamps.

Exposure for Kodachrome film. The Eastman Kodak Company suggests the following procedures for exposure and lighting for Kodachrome Type A film:

1. Load and unload your camera in subdued light. Retain the container in which the magazine was packed, and use it for sending the film to the processing station.

2. After the last picture has been made, rewind the film into the magazine; this will prevent any possibility of winding the film too far and tearing it loose from the supply spool.

3. A tripod or some other rigid support for the camera is required for exposures longer than 1/25 second.

4. The Exposure Table for Photoflood Lamps on page 66 is for flesh tones or for subjects of average color. For dark-colored subjects, use the next half-stop larger; for light-colored subjects, use the next half-stop smaller.

5. The light from all Kodak Handy Reflectors must be superimposed on the subject. This restricts the area that can be illuminated successfully by a few photoflood lamps.

6. Do not use more than six No. 1 photoflood lamps or three No. 2 photoflood lamps on a single fused circuit.

7. When you use an exposure meter, much more care is required with Kodachrome film than with films for black-and-white pictures. For further information refer to booklet "Full Color Kodachrome." [6]

Arrangement of Photoflood lights. Photoflood lights for slide making are an important aspect of the job. Here is how flood lights are operated:

1. Front lighting is important. Keep the lights near the camera axis, which is an imaginary line from the camera lens to the subject. Deep shadows should be avoided.

2. The Kodak Handy Reflectors should be placed on each side of the camera axis. No part of the reflectors should show in the finder of the camera.

3. At least half of the lights should be somewhat higher than the subject, whereas the rest should be at camera height to illuminate the shadows.

4. Daylight should be excluded; otherwise the pictures will be too blue.

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[6] Eastman Kodak Company, Rochester, N. Y. Obtainable at most local photography stores.

The following indoor exposure table should be used to assure satisfactory results.

INDOOR EXPOSURE TABLE

With No. 1 Photoflood Lamps * in Kodak Handy Reflectors

Shutter Speed in Seconds	*Number of Lamps*	*Distance from Lamps to Subject (No. 1 Pohtoflood Lamps)* f/1.9 or f/2	f/2.8	f/4	f/4.5	f/5.6	f/6.3
1/25	1	4 ft.	3 ft.				
	2	6 ft.	4 ft.	3 ft.			
	3	7 ft.	5 ft.	3½ ft.	3¼ ft.		
	4	8 ft.	6 ft.	4 ft.	3¾ ft.	3 ft.	
1/5	1	9 ft.	6½ ft.	4½ ft.		3¼ ft.	
	2	13 ft.	9½ ft.	6½ ft.		4¾ ft.	
	3	16 ft.	11½ ft.	8 ft.		5½ ft.	
	4	19 ft.	13 ft.	9½ ft.		6½ ft.	
1	1	21 ft.	15 ft.	10 ft.	9 ft.	7½ ft.	6½ ft.
	2	30 ft.	21 ft.	15 ft.	13 ft.	10 ft.	9½ ft.
	3	37 ft.	26 ft.	18 ft.	16 ft.	13 ft.	11½ ft.
	4	42 ft.	31 ft.	21 ft.	19 ft.	15 ft.	13 ft.

* With No. 2 Photoflood Lamps the distances in the above table should be multiplied by 1¼.

Example. If the correct distance with No. 1 lamps is 4 feet, with No. 2 lamps this distance should be 4 × 1¼ = 5 feet.

Use of photoflash lamps. The following table gives guide exposure numbers for use with Mazda photoflash lamps when flashed in an average synchronizer reflector, or for the No. 22 photoflash lamp in the Kodak Handy Reflector:

	SM	No. 5	No. 11	No. 22
Open *	50	90	100	145
1/100	50	75	80	115
1/200	35	60	65	90

* These guide exposure numbers should be used when the shutter is set for time or bulb exposure or an exposure of 1/50 second or any exposure slower than 1/50 second.

To obtain the proper *f* number, divide the guide exposure number by the distance, in feet, from lamp to subject. The answer is the recommended stop exposures in rooms with light-colored walls and ceilings.

Example: When Kodachrome Type A film is used on open flash (time, bulb, 1/25, or 1/50 second), the guide exposure number is 100 with the No. 11 lamp. If the lamp-to-subject distance is 9 feet, the correct f number of $100 \div 9 = f/11$; or at 6 feet, $100 \div 6 = f/16$.

For pictures taken outdoors at night, or indoors with dark-colored subjects or dark-colored surroundings, divide the guide exposure number by 2.

Caution: Under certain conditions, the glass bulb may crack or shatter when flashed. Therefore, it is recommended that a protecting transparent plastic screen be used over the front of the photoflash reflector. Do not flash in an explosive atmosphere.

"Shooting" the picture. The following steps should be followed when "shooting" pictures for black-and-white or Kodachrome slides:

1. Insert film in camera.
2. Clean lens with tissue.
3. Determine object.
4. Sight object in view finder.
5. Set camera in accordance with manufacturer's directions.
6. Check shutter speed.
7. Check distance.
8. Check diaphragm opening.
9. Keep your eye on the finder when "shooting."
10. Release trigger with a steady pressure.

Owing to variations in cameras and the type of film used, you should refer to the manufacturer's instructions for more technical information. If you do not have the original directions which accompanied your camera, do not hesitate to write for specific instructions.

For more information on producing slides refer to *Kodak Data Book on Slides* and *Visual Teaching and Kodaslides.*[7]

Example of Content of Home-Made Slides

The uses to which these slides can be put are limited only by the imagination and initiative of the instructor and his students. The following are suggested areas that may be visualized through the use of slides:

1. Manufacturing processes
2. Processing merchandise
3. Transportation
4. Military training
5. Advertising
6. Agriculture
7. Business organization
8. Office training
9. Salesmanship
10. Health
11. Accounting
12. Art
13. Home Economics
14. Physics

[7] Eastman Kodak Company, Rochester, N. Y. Obtainable at most local photography stores.

15. Chemistry
16. Science
17. Retailing
18. Languages
19. Mathematics
20. Geography
21. Training methods
22. Credits and collections
23. Marketing
24. Religious events

Student talks. Permit a pupil to develop his own slide pertaining to a specific lesson, and let him present it to the group with an interesting talk. You will be pleased with the results, since such a procedure often encourages self-conscious but otherwise excellent students to overcome their shyness, inasmuch as the attention of the audience is focused on the slide.

Materials for Handmade Slides

The supplies needed in the production of handmade lantern slides are inexpensive and can be assembled for use in the production of all types of slides. The special materials required for several of the slides can be secured for comparable costs from more than one supply house. For convenience, a suggested list of supplies is presented. All of the materials except those starred (°) can be secured at book and school supply stores, department stores, hardware stores; many can be brought from home.

Item of Material	*Suggestions*	*Purpose*
Ammonia	Household ammonia.	For cleaning and polishing glass.
Art gum eraser (Each student should have one)	Cut eraser into small pieces. Easier to use.	For removing smudges from etched glass.
Blotters (Each student should have one)	Small white or light colored blotters and 1 or 2 desk blotters.	For holding slide steady in tracing. Keeps tips of fingers dry. Avoids smudges. For applying slide and India inks.
Brushes	Water-color brushes are needed for applying ink and water color. Nos. 3-4 can be used.	
Cloth	Lint-free cloth. Nainsook or similar material may be used.	For cleaning and polishing slides.
Cover glass °	3¼" x 4" regular cover glass. It is cut accurately, and is of light weight.	For cover glass on all sides. For gelatine, silhouette, hinged, and ceramic pencil slides.
Drawing pencils (Each student should have one)	HB (Medium) or HB&H (Medium hard)	Use on etched glass. Use on lumarith.
Drawing pen	Crowquill pens or Esterbrook pens No. 32. Crowquill or Hunt round points No. 102.	For applying India ink.

Item of Material	*Suggestions*	*Purpose*
Glue	Transparent glue.	For pasting silhouette or cellophane slides.
Graph paper	10 and 20 squares to the inch.	Use in blocking out lettering.
Gummed dots or paper	Colored gummed dots about ¼" size.	Use for thumb spots on all slides.
Lantern slide masks *	Useful when making quantities of slides.	Used for masking slides.
Sandpaper	Medium and fine	For sharpening slide crayons and drawing pencils.
Scotch tape	½" tape	For holding slides in place when tracing.
Tape for binding *	½" gummed paper binding tape, preferably black.	For binding and masking.
Transparent ruler	6" ruler	Used with all slides.

Supplies needed for the production of etched glass slides:

Item of Material	*Suggestions*	*Purpose*
Etched glass	High grade etched glass is used. Glass can be re-used.	Pencil, crayon, ink slides.
Ketch	Cleaner for etched glass.	To clean slides.
Oil	Light weight.	To soften crayon when cleaning.
Slide crayons	Specially-prepared crayons are used.	To draw on etched glass.
Slide ink and solvent	Lantern slide ink gives best results. Apply with toothpick or fine brush.	To draw on etched glass.

Supplies needed for the production of Cellophane slides:

Item of Material	*Suggestions*	*Purpose*
Cellophane and carbon paper	Specially prepared for this use.	Typewritten slides.
White and colored cellophane	Secure at stationery or office supply shop.	India, slide ink, and colored silhouette slides.
Mats	Prepared mats come complete with cellophane, carbon, and mask.	Typewritten slides.

Sources of Slide Material

Here are several sources of supplies used in production of slides.

Chicago Apparatus Company, 1735-43 North Ashland Avenue, Chicago 22, Ill. For cover glass, etched glass, cellophane, binding, mats, labels, spots.

Eastman Kodak Company, Rochester, N. Y. For Velox transparent watercolors.

Kansas City Slide Company, Inc., 1719 Wyandotte Street, Kansas City, Mo. For cellophane, carbon, binding tape, ink, cover glass, etched glass.

Keystone View Company, Meadville, Pa. For projectors, etched glass, cover glass, crayons, ink, solvent, cleaner, cellophane, binding tape, cases, files.

George Murphy, 57 East 9th Street, New York, N. Y. For gelatine.

Radio Mat Slide Company, Inc., Daytona Beach, Fla. For cellophane, carbon paper, and mats.

J. C. Reiss, Visual Education, 10 Hill Street, Newark 2, N. J. For mats, lumarith, cellophane, carbon paper, etched glass, cover glass, binding tape, crayons, ink, solvent, cleaner, carborundum.

Ryan Visual Aids Service, 409-411 Harrison Street, Davenport, Iowa. For cover glass, mats, masks, binding tape, brushes, etched glass, radio mats, typewriter transparencies, carbon paper, and water color.

Transolene Company, Barrington, Ill. For translucent paper.

Turtox Service Department, General Biological Supply House, 761-763 E. 49th Place, Chicago 37, Ill. For cover glass, etched glass, ink, pencils, cellophane, carbon paper, binding tape, dots, brushes.

W. M. Welch Manufacturing Company, 1515 Sedwick Street, Chicago 10, Ill. For etched glass, cover glass, radio mats, binding tape, pencils, ink, mats, binders.

Williams, Brown and Earle, Inc., Scientific Instruments and Supplies, 918 Chestnut Street, Philadelphia 7, Pa. For projectors, slide cases, gelatine sheets, carbon, cover glass, mats, binding tape, labels, ink, etched glass, pencils.

DO's for Using Slides

DO determine the right spot for slides in the lesson plan.
DO secure slide catalogues.
DO determine the correct slides.
DO make your own slides for specific lessons.
DO arrange slides in proper showing order with the thumbmark in the upper right-hand corner.
DO focus projector and set up screen before group convenes.
DO have extra projector lamp, plugs, and extension cord available.
DO check seating arrangement.
DO check ventilation.
DO arrange an adequate signal if using a projector operator.
DO prepare student before presenting slides.
DO present slides in a psychological and orderly fashion.
DO leave image on screen long enough to permit student study.
DO use a pointer to focus attention on specific points in the picture.
DO use slides in connection with other audio-visual aids.
DO apply slide information as soon as possible.
DO test student's understanding.
DO reshow slides if necessary.
DO encourage students to prepare their own slide.

QUESTIONS

1. What are the values of slides for educational purposes?
2. Why are slides important educational aids?
3. What are the chief sources for slides?
4. What general features should be checked before slides are used?
5. What physical features should be checked before slides are shown?
6. What teaching procedure should be used when presenting slides?
7. Why should the instructions for each projector be studied and used before a slide presentation?
8. How does the "automatic" slide projector operate?
9. What is meant by "faxfilm" slide projection?

10. What is meant by microslide projection?
11. Should photographic slides be made or rented?
12. What are the steps involved in binding slides?
13. How would you make an etched glass slide?
14. How would you make lumarith slides?
15. How are silhouette slides made?
16. What are the advantages of two-by-two slides? How are they made?
17. How are black-and-white and Kodachrome slides made?

PROBLEMS AND PROJECTS

1. Prepare a class demonstration on how to make at least one kind of slide. (The instructor may divide the group into sections and assign a different slide to each.)

2. Prepare a list of possible uses for various kinds of slides in an actual or simulated organization—industrial, distributive, school, civic, social, or church.

3. Prepare an interesting series of slides about one topic and present them to the group with an interesting talk.

4. Prepare a summary for using slides.

5. Be prepared to demonstrate *how* to use slides in a projector, including a discussion of the reasons for your activities.

6. List the "Do's for the use of slides."

Courtesy of American Optical Co.

Using opaque projector to show enlarged illustrations, printed matter, and small objects.

Opaque and Overhead Projection

So you want to become a counterfeiter? Can you imagine being able to reproduce millions of dollars' worth of material merely by placing the object in an opaque projector? Unlike counterfeits, these reproductions are much larger, more beautiful, and more effective than they were originally. To top it all, the opaque projector is the simplest and least expensive of all large projectors.

The use of home-made materials in the opaque projector has a tendency to (1) stimulate attention, (2) arouse interest, (3) clarify information, and (4) help students retain knowledge for a longer period of time. It can also be used to (1) introduce subjects or topics, (2) present specific information, (3) test knowledge and ability, (4) review instructional problems, and (5) facilitate cooperative student-teacher participation in problem solving.

Sources of Pictures for Opaque Projector

An enormous amount of free and inexpensive material is available for use with the opaque projector. Transparent materials are not required; considerable time and money are saved. Any picture, photograph, cartoon, drawing, magazine illustration, textbook page, fabric, or other small

object may be used. It is a simple matter for the instructor to develop a comprehensive list of illustrations on any subject. The value of a picture list that is up-to-date, inexpensive, and usable in a variety of ways should be obvious.

These pictures and other instructional items may be projected on a regular screen for viewing by all members of the class. At this time, there are three projectors that will project 10 by 10-inch materials. This enables the projection of 8½ by 11 materials, allowing for the margins. In the trend towards increased projection capacity there has also been a trend away from combining opaque projection and slide projection. All of the large-apertured opaque projectors project opaque materials only.

There have been several noteworthy features resulting from the development of modern opaque projectors. Through the use of improved optical systems, it is now possible to project opaque materials in partially lighted rooms, although results do improve considerably as the room is darkened. Through the use of lightweight metals the weight of opaque projectors has been decreased in spite of their ability to handle larger materials. An emphasis upon the ease of operation has brought forth several interesting facts. It is no longer necessary to mount opaque materials—the modern opaque projectors are designed with vacuum type platens that hold copy from 8½ by 11 to postage-stamp size without fluttering. No longer need the platen be lowered to insert sheets of material with the resulting disturbance of a light flash. The modern projector is now equipped with an endless belt conveyor that will permit copy to be easily inserted without lowering the platen. One projector, the Beseler Vu-Lyte, is equipped with a built-in optical pointer that permits the instructor to direct an arrow of light to any point on the projection screen. This permits the instructor to "point" without leaving the projector, and without casting an obstructing shadow with a conventional pointer.

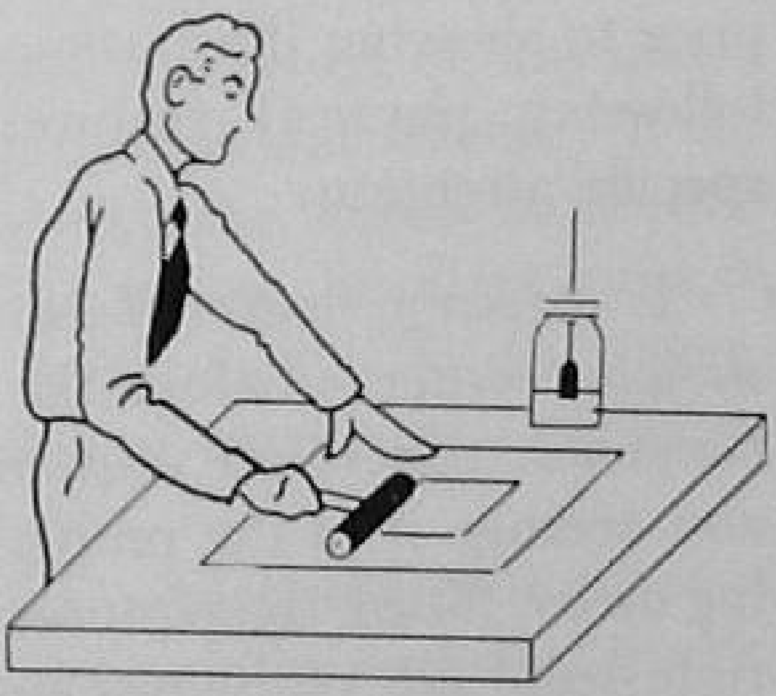
The daily newspaper and the scores of popular magazines will supply you with a wealth of materials. Business, agriculture, industry—all have trade journals and other publications. Each publication has myriads of illustrations, of all kinds and for every need. Only a little research will enable the instructor or personnel trainer to have these illustrations in his classroom. As a service to the users of opaque projectors, the Charles Beseler Company, 60 Badger Avenue, Newark, N. J., has published a series of bulletins known as "Opaque Projection Practices." These bulletins are a compilation of the experiences of classroom teachers at all levels and are an excellent source of information on how the opaque projector may be used effectively. They are available without charge upon request.

How to Use the Opaque Projector

Select proper material. Selecting the right material for a specific situation will assure successful learning. An instructor who is thoroughly acquainted with his teaching problems will be on the continual

look-out for pertinent material. If complete units of illustrations or individual pictures have been constructed for specific problems, the instructor will find it helpful to note this information in the audio-visual aid column of his teaching plan. As new material is added to your collection, bring your plan up to date. Do not hesitate to replace worn or outdated illustrations with newer and better pictures.

Prepare materials for use. A large magazine, a section of a newspaper, a photograph, a textbook, a sales slip, an actual three-dimensional object as well as any other opaque material may be projected without special preparation. Anything placed in the 10 by 10-inch opening can be projected on the screen in its true color.

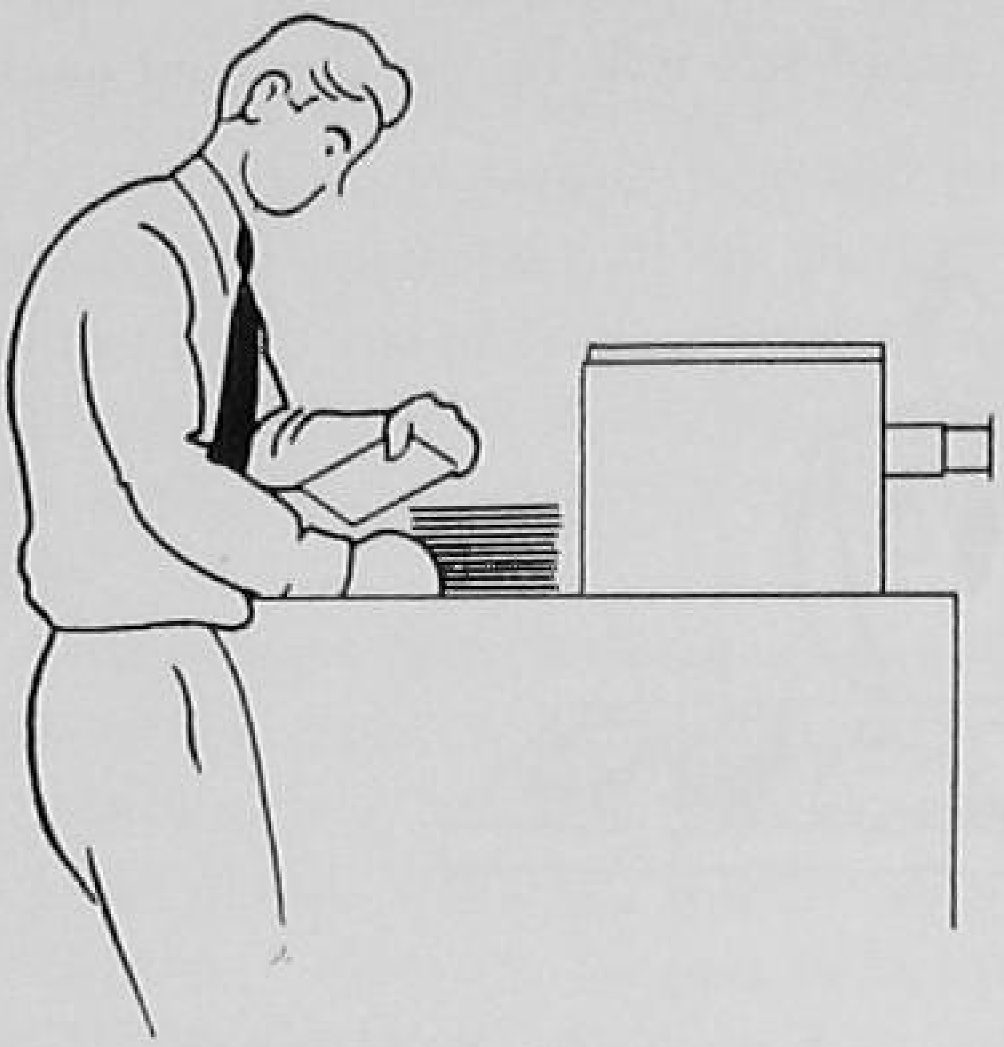


Although it is not necessary to mount materials when using modern equipment, it is advisable in the formation of a permanent file to provide for protection, easy storage, uniformity of size, and, therefore, easier filing and locating. The following factors should be considered when selecting and mounting materials:

1. The actual projectable material should not exceed 10 by 10 inches and if possible should be cut to this size. However, since the limiting dimension on most opaque projectors with continuous feed is 11 inches, the material need not be cut if it is no more than 11 inches high.

2. For permanence, select a medium-weight mounting cardboard. For uniformity of size, a standard 8½ by 11 sheet of bond paper will do.

3. Neutral colors are satisfactory but, for more dramatic effect, use colored backgrounds that blend with the picture. Black mounting materials should never be used.



4. Cut cardboard to the same shape as the platen, which is in most cases 11 by 12 inches. Allow an extra inch or a small thumb space on the right-hand side for filing-index information and ease in handling.

5. Cut pictures straight, and mount them evenly and smoothly on the cardboard.

6. Center picture on cardboard, allowing for the extra space on the right side. Remember that the illustration is inverted when placed in projector.

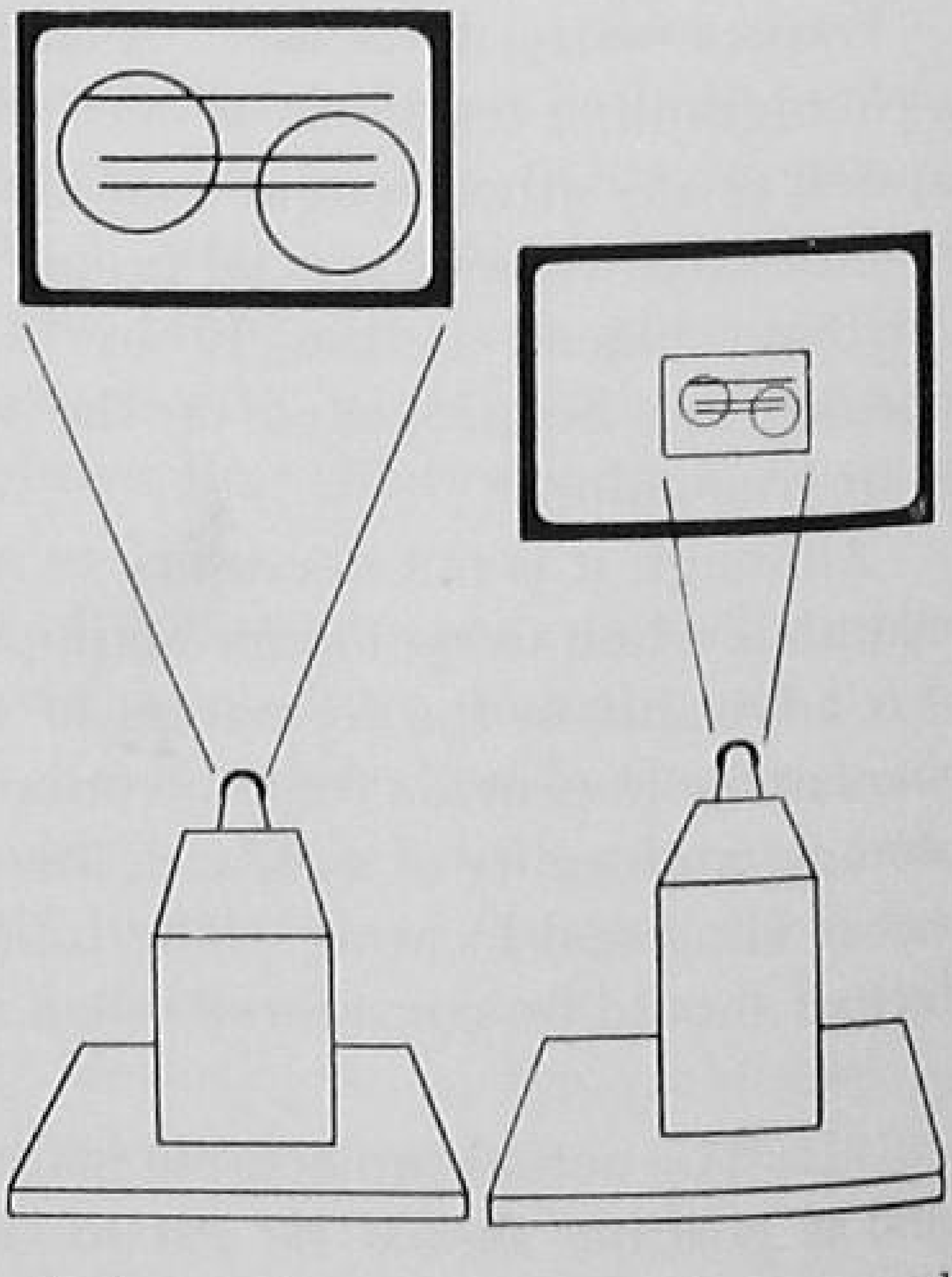
7. Cover the entire back of picture with adhesive.

8. Carefully press picture to the mount, working from top to bottom.

9. If desirable, place brief title of explanation on mount.

10. Place lesson classification and other filing information in space on the right-hand side.

Check all physical features. All physical features must be checked prior to showing illustrations. The following physical features need specific attention:



1. *Arrange material in proper showing order.* Before the group convenes, collect all your material and arrange it in the proper showing order. Stack the pictures on the right-hand side of the machine, face up and inverted. This is the position of the material in the projector; correct placement of material facilitates its use when the classroom is darkened.

2. *Set up projector and screen.* Unless the opaque projector and screen are permanent fixtures in the classroom, it will be necessary to set up the equipment before the class meets. If possible, place the projector on a 40-inch stand to avoid obstructing the light ray. The size of the

screen and the focal length of the projector lens should also be considered in determining the distance between the screen and the projector. The following table may be used to determine image size with respect to projection distance:

LENS FOCAL LENGTH	(USING 10″ x 10″ COPY) AT PROJECTION DISTANCE (Shown in feet)								
	5′	7.5′	10′	12.5′	15′	17.5′	20′	22.5′	25′
18″	24″	42″	58″	75″	90″	105″	125″		
22″		34″	48″	64″	75″	90″	105″	125″	
26″			34″	45″	60″	70″	80″	94″	105″
	ABOVE FIGURES INDICATE SIZE OF SQUARE IMAGE (Shown in inches)								

Focal length of lens and distance from screen determines size of image. Variation in lens diameter has no effect on image size. The larger diameter lens simply delivers more light on the screen. (Courtesy Charles Beseler Company, Newark, New Jersey.)

A smaller but brighter image may be obtained by shortening the distance between the projector and screen.

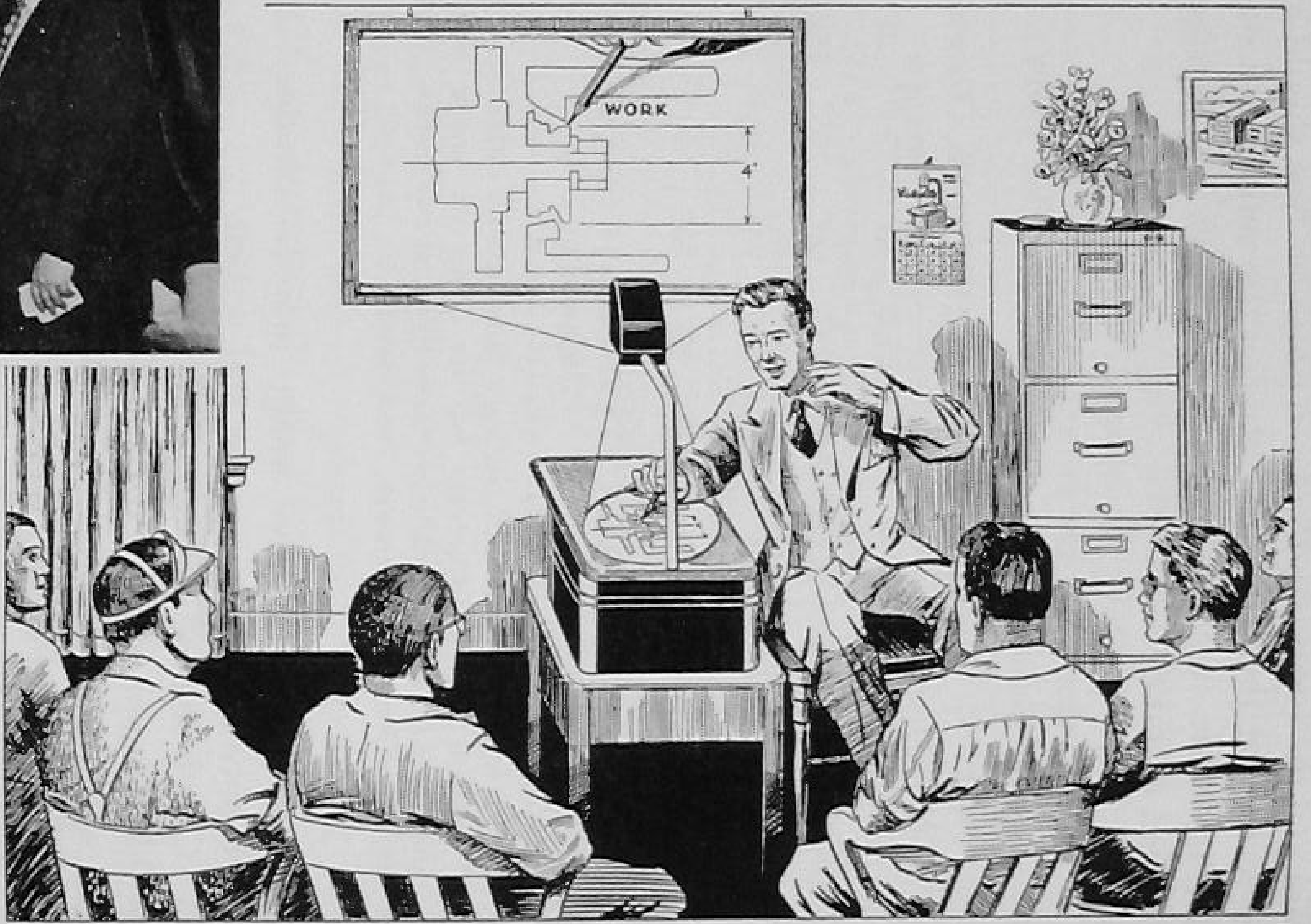
3. *Check seating arrangement.* For good vision, the student should sit within the space formed by a 60-degree angle. Leave several feet of vacant space between the first row and the screen. If the projector is not high enough for the light ray to pass over the heads of the seated students, leave a vacant space between the projector and screen. If the room is difficult to darken, it is recommended that the screen be located in a corner of the room at an angle so that the screen, in effect, rests in its own shadow. By locating the projector perpendicular to the screen, it is then possible to derive another benefit, that of locating the projector out of the field of view.

4. *Check lighting.* The opaque projector, which depends upon a good mirror for reflection, may be used in a partially darkened room. However, to obtain best results, the classroom should be darkened as much as possible. Prevent rays of light from falling directly on the screen or shining on the faces of the students. Test the electric outlet for the projector to make certain the power is on when the room lights are off.

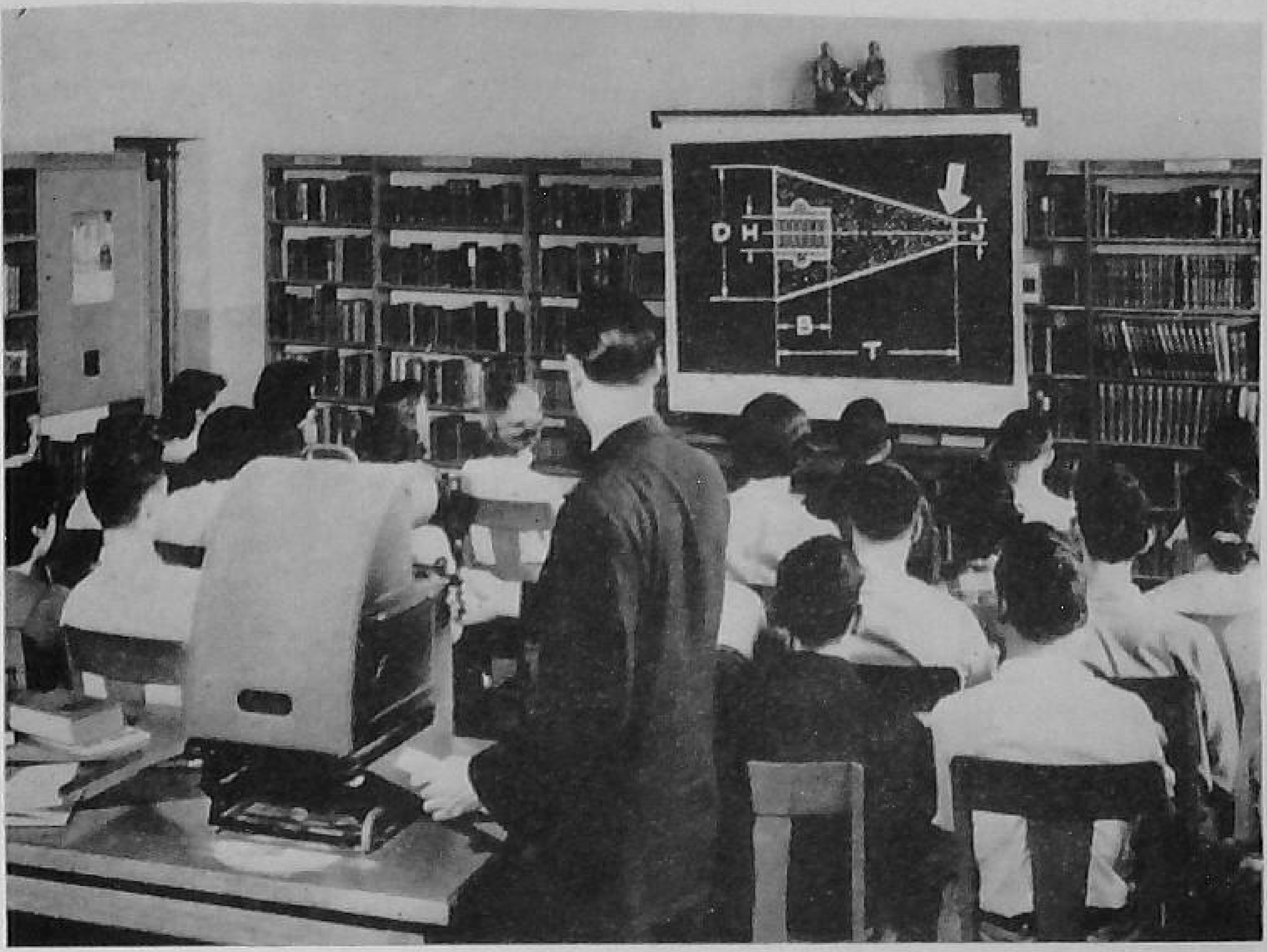
5. *Check ventilation.* Sacrifice darkness for sufficient ventilation. It is difficult for learning to take place in a hot, stuffy room. Poor ventilation may be avoided either by using (1) an inexpensive "darkroom" ventilator, (2) an ordinary electric fan, or (3) a portable cooling unit.

Courtesy of Victorlite Industries

The Visual Cast being demonstrated to group of "key" executives.



The Visual Cast projects as the teacher writes.



Courtesy Charles Beseler Co.

Using the opaque projector in the classroom.

6. *Test projector.* Just before class time, turn on the projector. Insert your first picture and focus lens. To prevent mishap, have an extra lamp on hand. Turn off projector and have everything in readiness. When the time comes to exhibit your picture, turn off room lights and flash image on the screen.

7. *Check screen size.* The picture must be seen by all if the desired effect is to be achieved. In the use of the opaque projector this important point has often been neglected. It should be remembered that normal 20/20 vision is the ability to distinguish a $\frac{3}{8}$-inch block letter at a distance of 20 feet. This means that someone sitting at 40 feet would have to have a letter twice that size in order for it to be visible to him. It is recommended that the opaque projector be used on large screens; for average classroom use, a 70 by 70-inch screen is suggested.

Presenting materials with the opaque projector. The use of the opaque projector is usually not a continuous procedure; the instrument lends itself to the projection of a few pertinent illustrations at crucial moments. However, when a series of related pictures are being used, the procedure is very similar to the filmstrip and slide technique.

Observe the following steps for successful teaching:

1. *Prepare the student.* Everyone knows that a sale can be made or lost by the manner in which the sales person approaches the customer. This is also true in teaching situations. Regardless of your excellent plans, unless you prepare the student, most of your efforts will be wasted. Inform the student (1) how he will benefit by the instruction, (2) what to look for in the illustration, and (3) that his knowledge will be tested at the completion of the showing.

2. *Present picture and instructions.* Present each picture smoothly and in proper sequence. Briefly tell and show the important points in each illustration. If you are being assisted by an operator, stand beside the screen and use a pointer to direct attention. Encourage class discussion, but do not permit discussion to get out of hand or become lengthy. Stress all principal steps. Do not present more than the student can assimilate.

3. *Apply instruction.* Have the student apply the things learned as soon as possible. He should be able to explain each step. He should have acquired and be able to employ proper technical terminology.

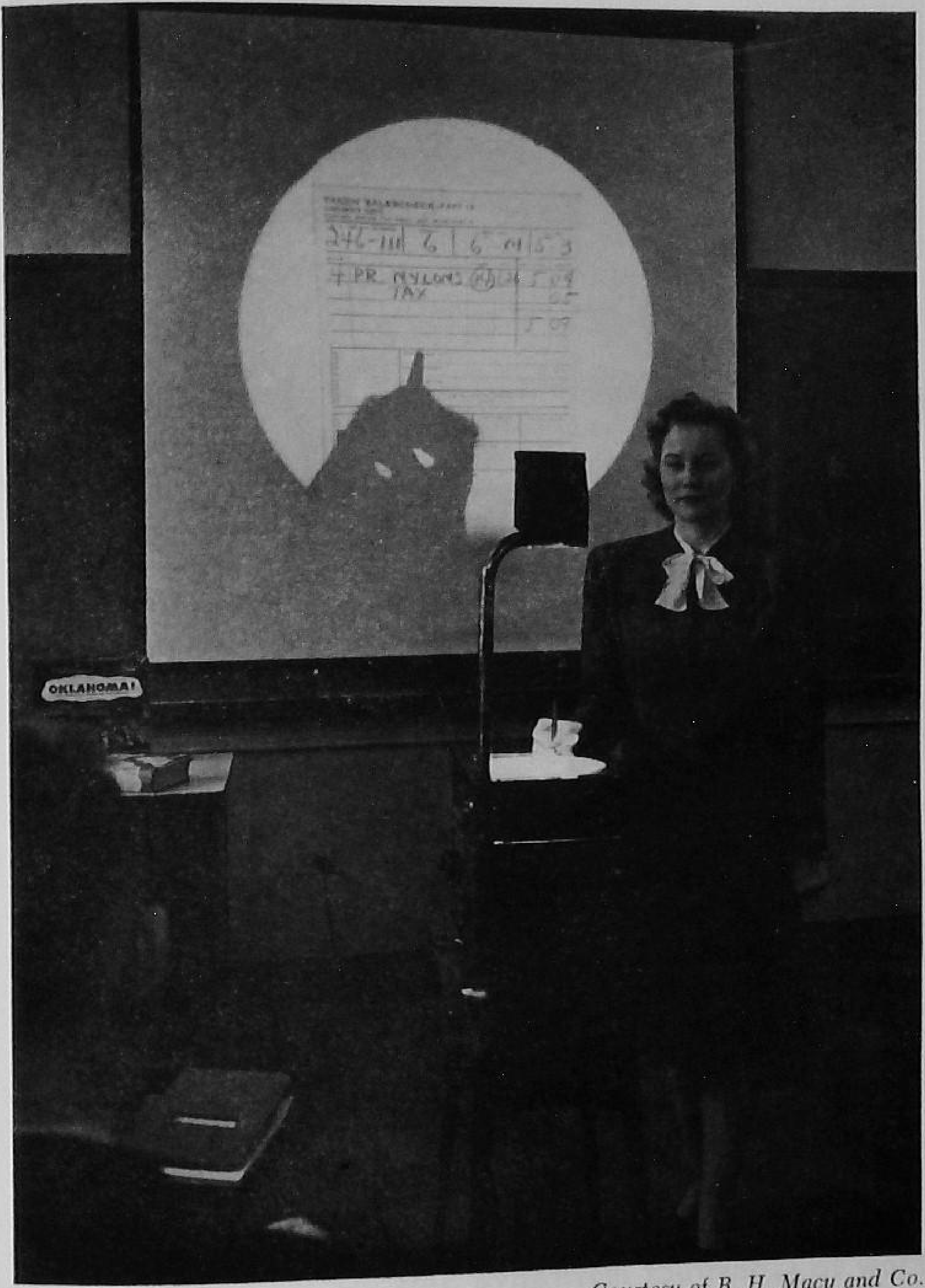
4. *Test student.* Test the student's knowledge. Best results are obtained when the student thinks the test results will be used to correct his errors. Objective questions, such as (1) true-false, (2) completion, (3) multiple choice, and (4) matching type, alleviate the tiresomeness that usually accompanies the essay-type test. Simple check sheets or quizzes are very effective and may be easily graded. Check the student's performance and speed. Correct all errors.

5. *Review the instruction.* An excellent review of the instruction is obtained by briefly exhibiting the key illustrations, without comment. If a series of pictures were used, it is merely necessary to reshow those that are pertinent. The errors made in the application and testing are a good indication of what to reshow. The final test of successful teaching is: Can the student perform? Remember, if the student cannot perform, the instructor has not taught.

How to Operate the Opaque Projector

The opaque projector is bulky in appearance, but is easy to operate. It is necessary simply to (1) insert the material on the metal tray or "platen," (2) push housing in place with lever, and (3) adjust the lens to bring image into sharp focus.

There are several combination models and special attachments for the opaque projector. In each case, the manufacturer's directions should be followed. However, *the following steps are basic for operating most models:*



Courtesy of R. H. Macy and Co.

Using the Visual Cast in "systems" training.

Courtesy Bausch & Lomb Optical Co.

Inserting a mounted picture in the opaque projector.

1. Set up projector and insert plug in electric outlet.
2. Turn on lamp.
3. Turn on motor for cooling system.
4. Place picture on metal tray or "platen" and bring housing into place with lever. The bottom of the picture should face the front of the machine.
5. Bring image to sharp focus by turning lens left or right.
6. If pictures are post-card size or smaller, use the card holder which is in the slot under the metal tray.
7. If using a newspaper, magazine, or textbook, or actual objects, adjust the lens for each. Turn blower to full speed.
8. After showing material, turn off blower and projector lamp. Roll up extension cord, cover projector, and return the machine to storage after training group leaves.

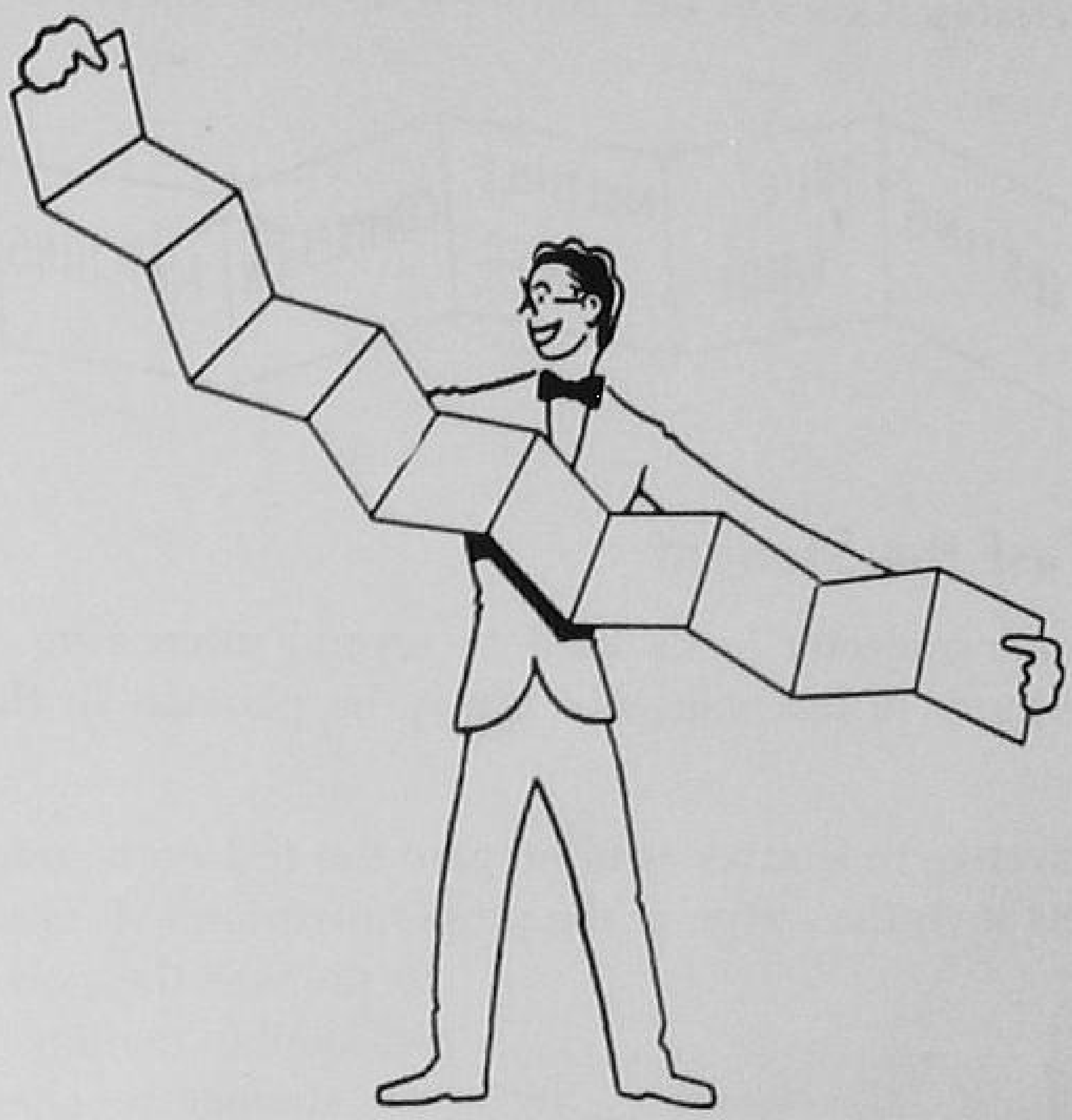
How to Construct Illustrative Sets

How to make folded card sets. Related illustrations covering a complete segment of knowledge may be exhibited as a single unit. One method is to make a folded card set. This is done as follows:

1. Assemble a group of individually mounted pictures in the desired order. Use 8 by 8-inch mounts for folded card sets.

2. Lay out pictures on table in order, from right to left, facing you.

3. Attach each mount to next one with a piece of ¾ or 1-inch cloth binding tape in the back.



4. Leave a small space, about 1/16 or ⅛ inch, between mounts to allow for folding.

5. Place topic, unit or subject, and other identification on the back of the first mount to facilitate filing.

These pictures will fold into a small compact unit, and as each mount is pushed through the projector, they refold in the same order.

How to make a rolled paper base. Another method for constructing a series of pictures is to make a rolled paper base as follows:

1. Arrange related illustrations in desired order.

2. Secure ordinary rolled wrapping paper or shelf paper and, if necessary, trim it to an 8-inch width.

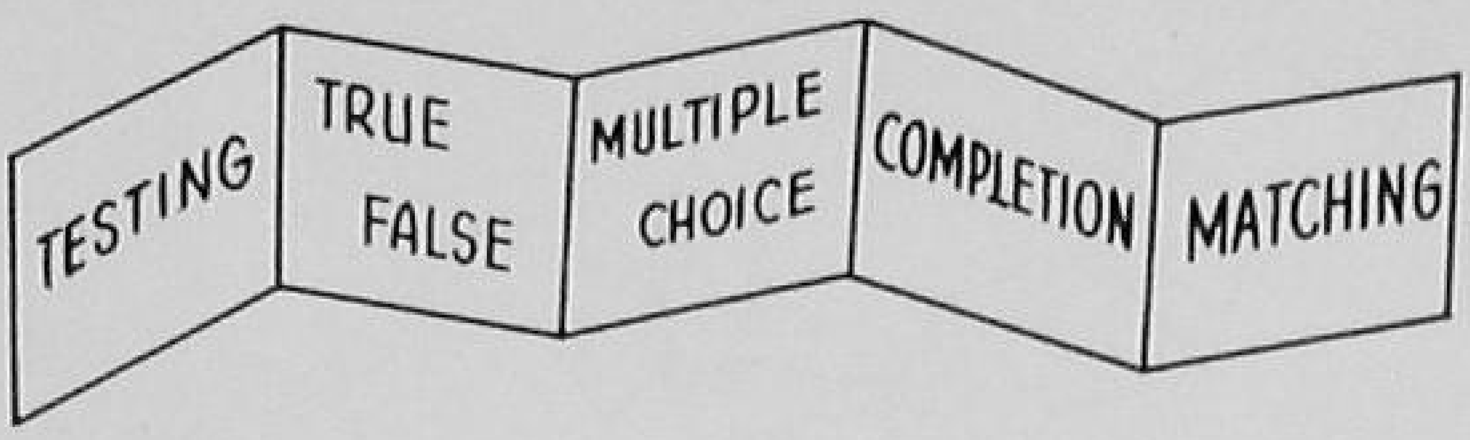
3. Paste materials in center of paper facing you, allowing 6 inches for each picture.

4. Work from right to left, and leave at least 1 inch between pictures.

5. Roll the complete unit and keep it intact with rubber band.

6. Identify material on outside of roll for filing.

An average lesson unit will require about 8 or 10 feet of rollpaper, which is sufficient for twenty or more illustrations. After guiding the beginning of the roll through the machine, handle it like a scroll, unrolling the material as it goes in, and rolling it up as it comes out.



How to Test the Student

The opaque projector lends itself to several interesting and helpful testing procedures in teaching, which may be planned in the following ways:

1. An effective time saver is to prepare the test on a suitable mount, and to project it on the screen at the proper occasion. It is also possible to prepare the correct answers on similar mounts and permit the student to check his own test by projecting the answers on the screen. Unless it becomes necessary to revise the test, it may be used in successive class groups.

2. Another method for using the opaque projector in testing is to project a picture with a brief question concerning it. A simple multiple choice or completion question may be placed directly beneath the illustration. The correct answers can be prepared in an accompanying set.

3. The short-exposure technique may also be used to good advantage in testing, in which case the paper roll base will be best. The paper roll base is prepared so that after the question is projected, the paper can be moved until a black space appears on the screen. When the paper is moved a little more, the correct answer will appear.

For most projectors, it will be necessary to leave about 6½ inches between the question and the answer. You can avoid leaving this space

by placing a sheet of white paper over the question. White paper is best because it reflects a brilliant white light on the screen.

Objective questions, such as the true-false, completion, multiple choice, and matching type, should be used exclusively. The answers may be oral or written. Make your exposures as brief as possible. The possibilities in this type of testing are unlimited.

How to Classify and File Material for Use in Opaque Projectors

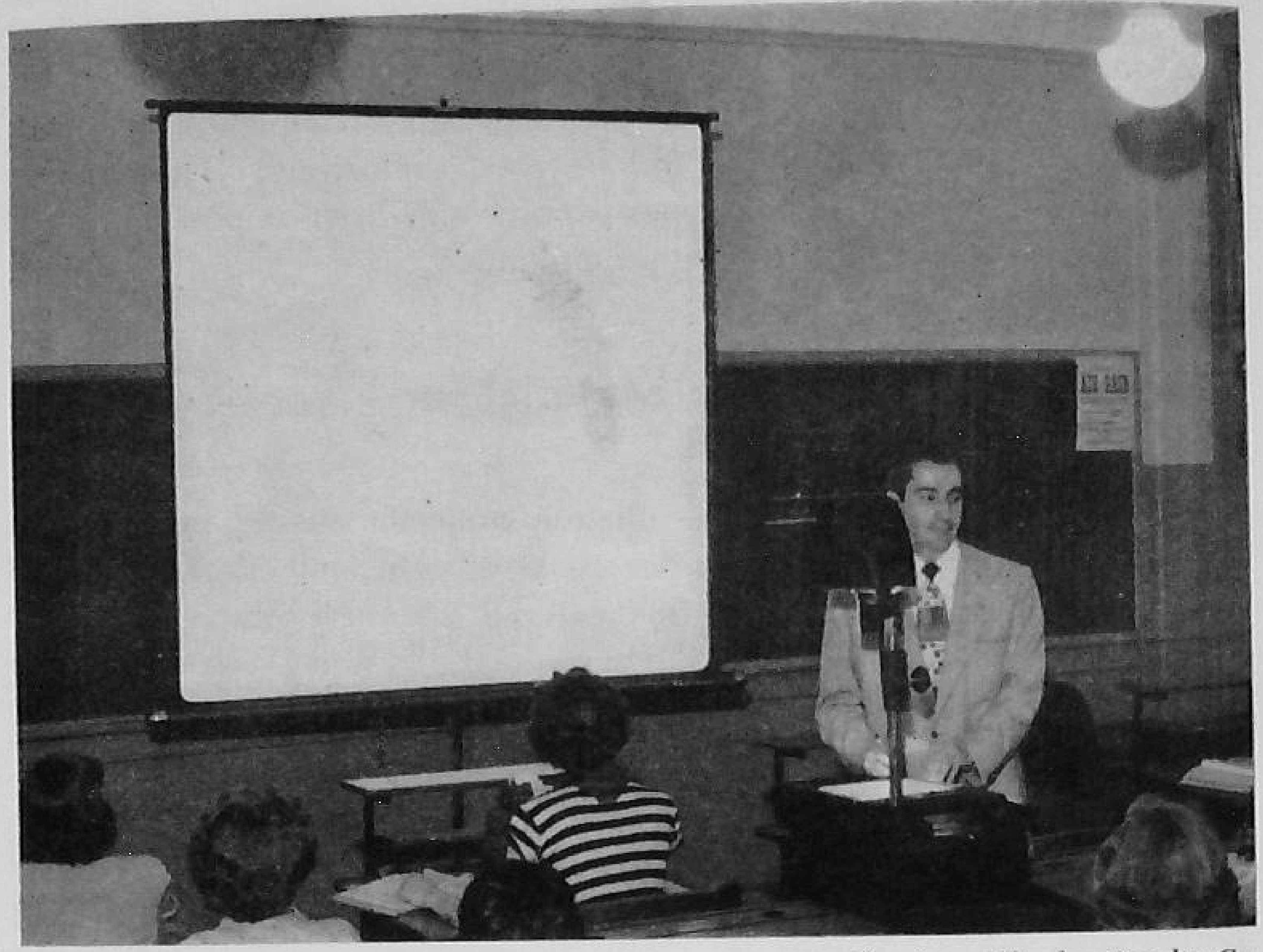
All teaching material for the opaque projector should be classified and filed for future use. In order to save time and effort, devote a section of your cabinet or file to this material. Several inexpensive letter files will serve the purpose. Arrange the material alphabetically, by job problems, by subject matter, or in any other effective manner.

The Overhead Projector

Recently a new medium of idea communication, known as Overhead Projection, has appeared on the scene and has gained tremendous interest. The projection equipment involved is a large-aperture (7 by 7 inches or 10 by 10 inches) slide projector. However, it is very much like the opaque projector in that a large number of instructional items such as as charts, graphs, pictures, maps, diagrams, and worksheets may be projected on a screen for class study and discussion. These instructional items must first be converted into transparencies by your local photographer. This is an inexpensive operation, and a transparency, once it is made, may be used repeatedly The instructor can write directly on the transparency with a marking pencil as the object is being projected, and at the end of the class period the pencil marking may be removed from the transparency by wiping it with a clean cloth. A heavy sheet of ordinary cellophane may also be placed over the transparency; the instructor can write directly upon it.

Overhead projection enables a speaker to face his group from the front of an illuminated room and project on the screen above and behind him. The speaker can write, sketch, and erase as he is presenting his lecture. In addition, transparencies can be prepared in advance and used at the discretion of the speaker, with no dual operation. Important psychological techniques, including progressive disclosure and overlays, can be used in no more effective way than with the overhead projector.

Obviously, the advantages that accrue from the use of overhead projection are many. A speaker facing his class at all times can observe reaction of the class to his presentation and gauge himself accordingly.



Courtesy Charles Beseler Co.

Using the overhead projector from the front of the classroom.

Unspoken questions can be observed on students' faces and ferreted out by an alert instructor. This will result in a basic soundness of the educational structure the speaker is attempting to create. Using the projector in an illuminated room removes a prime objection to all prior materials of visual instruction, since ventilation is not impaired and the classroom conditions can be regulated to the optimum situation, resulting in maintaining the student's "receptive attitude" at its peak level.

With the aid of a wax crayon and cellophane, the speaker can sketch or write key words to highlight his verbal discourse, and he may erase markings readily with a dry cloth. A cellophane roll is obtainable upon which an instructor may prepare an entire course. He may use it both for his own reference and as a means to insure accurate student notes. In a method such as this the time saving is phenomenal.

Progressive disclosure is an important feature that can be accomplished readily on overhead projection and is easily achieved by simply covering that portion of the transparency which is not to be seen with an opaque page.

With overlays a completely new concept of instruction is opened by the gradual build-up of a situation by superimposition. This technique is of great help in teaching any subject where a basic problem is considered and complications or elaborations are added.

Overhead projection has one disadvantage, namely, the difficulty of obtaining material. At present, there are commercially prepared transparencies in only a few subjects. However, techniques have been developed by which instructors may prepare their own materials easily and at small cost. These techniques enable an instructor to take full advantage of his teaching potential.

Commercially available at this time are transparencies in the field of bookkeeping and auditing, and selected transparencies for geography.

The following is the procedure for the operation of the overhead projector:

1. Set up the projector at the front of the room with the projector lens facing the wall, blackboard, or screen.
2. Turn on switch.
3. Place the transparency on the glass top with the right side up.
4. Adjust projector lens until image is in sharp focus.
5. When writing on the transparency, be careful not to obstruct the view with your hand.
6. After the class session, remove all pencil markings on the transparency with a clean cloth.

Because of the unique optical system of the overhead projector, it may be used in a fully lighted room. However, darkness will considerably improve the projection results attained. It is recommended that a 70 by 70-inch screen be used. This screen should be set up so that the beam of light emanating from the projector is perpendicular to the surface of the screen. Manufacturers of screens sell the parts necessary to do this.

There is available from the Charles Beseler Company, 60 Badger Avenue, Newark, N. J., manufacturers of the overhead projector, a manual entitled "Vu-Graphics" which describes the use and applications of this device.

How to Operate the Visual Cast

The Visual Cast projector is similar to the opaque projector in that a large number of items such as work sheets, charts, graphs, pictures, maps, diagrams, operational sheets, and saleschecks may be projected on a screen for class study and class participation. However, first it is necessary to have the material which is to be projected converted to transparencies by your local photographer or the Visual Cast Company. This is an inexpensive operation, and once a transparency is made, it may be used repeatedly. The instructor can write directly on the transparency with a chemical pencil as the transparency is being projected, and at the end of the class period, the pencil markings may be removed from the

transparency by rubbing it with a clean cloth. A heavy sheet of ordinary cellophane may also be placed on the transparency, and the instructor can write directly on it.

Use the following simple procedure to operate the Visual Cast:

1. Set up the projector at the front of the room with the projector lens facing the wall, blackboard, or screen.
2. Turn on switch.
3. Place the transparency on the glass top with the right side up.
4. Adjust projector lens until image is in sharp focus.
5. When writing on the transparency, be careful not to obstruct the view with your hand.
6. After the class session, remove all pencil markings on the transparency with a clean cloth.

Setting up the Visual Cast. The screen should be located at a position in the room which is shadowed or shielded from direct illumination, either artificial or natural. Plenty of light should be provided for the room and trainees, but this light must not shine on the curtain.

The Visual Cast may be set upon a standard-height table if the instructor wishes to stand while teaching, or it may be placed so that the top of the lens table is approximately 30 inches from the floor for the instructor who wishes to be seated while training. Victorlite manufactures special tables to accommodate either position with an area provided for using and storing the special Victorlite holder for use with Victorlite transparencies.

For best visibility by the audience, the bottom of the 6 by 6-foot screen should be approximately 4 feet from the floor. Under such conditions the top of the screen should be tilted forward about 10 inches, and the Visual Cast should be approximately 9 or 10 feet from the screen. To bring about this condition, it is sometimes necessary to rearrange the students' chairs, beginning as close to the back wall as possible with the first row of chairs. If the room is so large that the students in the back cannot see details in the screen picture, a much larger screen should be used, and the Visual Cast moved away from it to bring the picture to the full size of the screen. The pictures are framed to make them rectangular or square. It is, therefore, often possible to use the Visual Cast a little farther from the screen in order that the actual picture may fully cover the screen. Under this condition some light will spill around the screen when the framed picture is removed.

Selecting screen for Visual Cast. A mat finish screen is preferable for class rooms and provides visibility from wide angles. A beaded screen is recommended only in those cases in which the illumination in the room is very intense and is shining more or less directly upon the screen. A beaded screen loses its efficiency when viewed from one side and is there-

fore not practical for a wide classroom or when viewed from the sides and closeup. It is indispensable under unusual illumination conditions

It is recommended that a screen at least 6 by 6 feet square be used for classrooms up to 40 feet wide.

DO's for Using the Opaque Projector

DO convert for projector use the unlimited amount of free and inexpensive training material.
DO select the right material for the right job.
DO mount your material.
DO keep material up-to-date.
DO arrange material in proper showing order.
DO set up projector and screen before class meets.
DO check seating.
DO check lighting.
DO check ventilation.
DO prepare student for observing illustration.
DO present pictures smoothly and in proper sequence.
DO apply teaching as soon as possible.
DO test student.
DO reshow key pictures.
DO follow manufacturer's directions for operating the projector.
DO turn on blower to high speed when projecting from text book, newspaper, or small objects.
DO prepare problem sets.
DO use for problem testing.
DO classify and file teaching material.

QUESTIONS

1. What are the advantages of the opaque projector?
2. What are the sources for pictures?
3. What is included in "checking physical features"?
4. What are the steps for successful training?
5. What are overhead projectors? What are their advantages?
6. How are illustrative sets constructed? (Folded cards—rolls.)
7. How may the opaque projector be used in testing?
8. How should materials for opaque projections be classified and filed?
9. What are the advantages of using an overhead projector?
10. How does the overhead projector differ from the opaque projector?

PROBLEMS AND PROJECTS

1. Write a brief report on how to select materials for the opaque projector.

2. Study and practice with the opaque projector until you are capable of demonstrating its operation before the class.

3. Prepare a short series of "card" and "roll" illustrative sets on any educational or training topic. As few as six cards or illustrations may be made, but they should be inclusive enough to cover the topic selected.

4. Construct and be prepared to demonstrate *cards* for testing purposes.

The test should cover a short unit of subject matter in any educational or training topic.

5. For evaluation at future meetings of the class—bring samples of maps, charts, diagrams, and graphs. Be prepared to show how to use these aids with an opaque projector.

6. List the "Do's for the use of the opaque projector."

7. Prepare a series of transparencies and develop a lesson in which you are interested, using the overhead projection technique.

Courtesy of National Cash Register Co.

Classroom scene of Sugar Camp. New salesmen for cash register and accounting machine receive their first formal NCR training at Sugar Camp. It is also used for refresher or post-graduate courses of senior NCR salesmen.

Maps, Charts, Graphs, and Diagrams

Maps, charts, graphs, and diagrams have been named the "spark-plugs" of visual training because they are easy to make and are effective devices for instruction. Extensively used in every type of industrial organization, by business concerns, in agriculture, and in many other types of instruction, these teaching aids make dry and often meaningless facts more understandable and interesting. *They could be used more often.*

How to Prepare Maps for Teaching Purposes

You do not have to be a cartographer to make maps for teaching purposes.

Home-made maps are indispensable in the teaching of subjects too numerous to mention. Home-made maps can be made cooperatively by the instructor and student. In addition to the home-made variety, other useful maps may be obtained from various governmental bureaus, oil and railroad companies, and other business concerns. Valuable maps, as well as charts, graphs, and diagrams, may be cut from magazines and newspapers and mounted, labeled, and filed for future use.

Preparing maps does not necessarily require artistic ability, but careful attention to a few simple rules will be worth while. *The suggested steps of procedure are as follows:*

1. Make small pencil sketches of maps that will be useful in illustrating the problem. Such maps may be made with soft pencil on small pieces of paper.

2. Decide which type of map will best clarify the ideas. Consider the possibilities of using charts, diagrams, or other visual aids.

3. Decide whether the selected visual aid is to be drawn in ink, crayon, or other media.

4. Become familiar with drawing materials and equipment.

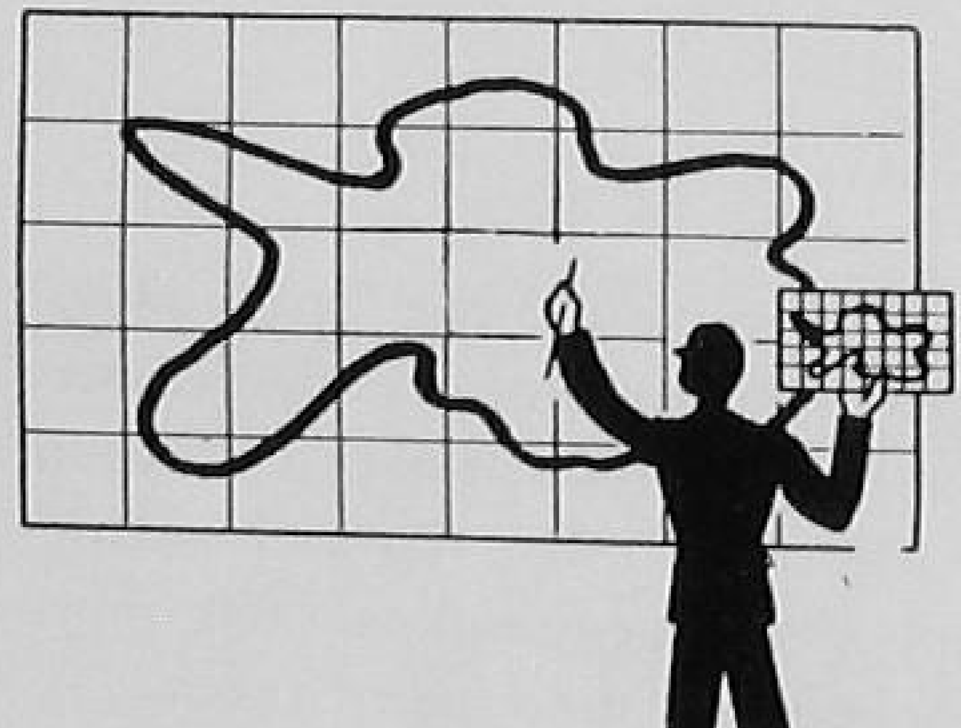
5. Decide on the size of map needed for the instruction.

How to enlarge a small sketch. A small sketch may be enlarged by proportional squares or by projection.

Enlarging by proportional squares.

1. Divide the vertical dimension of the small sketch into eight equal spaces. This can be done by folding the vertical edge into halves, then quarters, and then eighths.

2. With one of these spaces as a unit of measure, space off the horizontal dimensions.



3. Rule vertical and horizontal lines from the points obtained from the procedures in (1) and (2) above, dividing the entire sketch into squares.

4. Number these squares consecutively from left to right in the upper row, continuing in the same manner for the other seven rows.

5. Fasten the required size paper on the drawing board or easel, leaving a margin of several inches on all sides. Wrapping paper can be readily procured and used, although drawing paper or cardboard will give much better results.

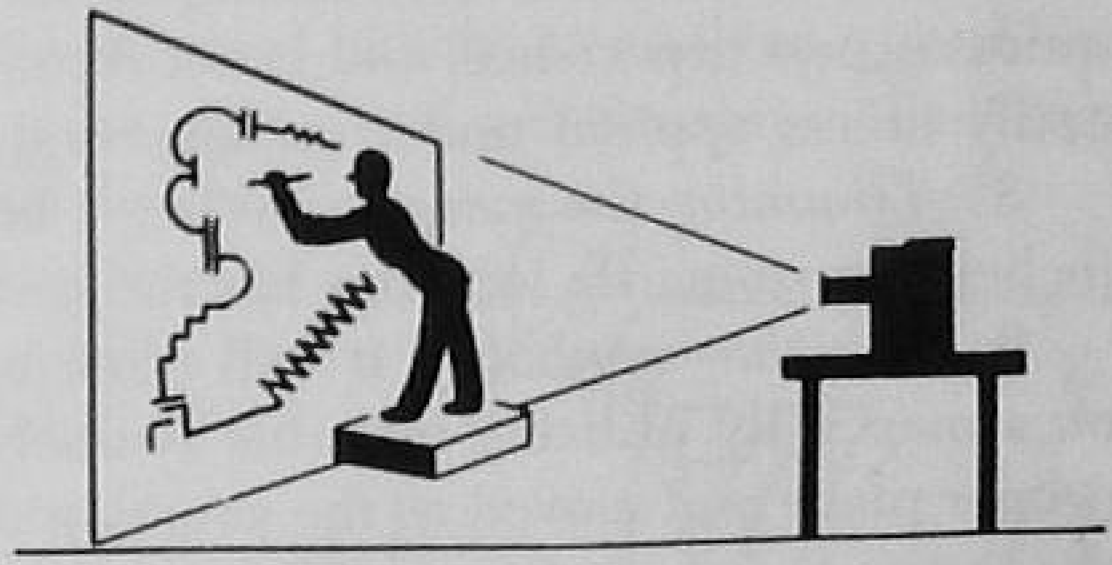
6. Divide the paper into the same number of squares as on the small sketch, leaving a 2-inch margin on all sides. A simple way of putting the squares on the large paper is with a piece of twine a foot or so longer than the drawing. Rub a light-colored chalk over the twine until the latter is thoroughly covered with chalk dust, which is accomplished easily if the twine is held taut. Stretch the twine between the upper left mark and the upper right mark, and snap the cord against the paper as a carpenter does a chalk line. Continuing in this way, rule the entire paper into squares, numbering each to correspond with the squares on the small sketch.

7. Transfer the features from each square on the small map to the

correspondingly numbered squares on the enlarged map as described below.

Enlarging by projection. If an opaque projector is available, much time can be saved and greater accuracy secured. By this device, the small sketch is projected directly onto the large paper. The distance between the projector and the paper must be adjusted until the image is the size wanted. It is then necessary only to sketch in pencil what is to appear on the map.

1. *Transfer of features.* Usually the best method is to transfer all features to the enlargement in pencil (using the proper scale), and then, before commencing to ink, to block out spaces for lettering.



It is a good idea to ink in the names first, but the instructor who is not familiar with the use of his pens will profit by getting practice on a piece of scrap before commencing to letter. A common error is to complete large objects first, then superimpose the names over the features. This results in unclear and untidy drawings.

Names, subjects, or titles should be printed within cleared space, so that a small white margin will be provided for each name. It may be necessary to use an arrow to indicate the exact location of the thing emphasized. When a special feature is to be emphasized, it is good practice to ink in this feature first so that all others can be subordinated to it. Whatever the procedure selected, provide spaces for names and reference data.

2. *Reference data legend.* On instructional maps or charts certain data should be shown: the name of the fact, topic, subject, or problem; the date; a simple unit of measure or scale; and a direction line. Such data may be placed in a separate, convenient place or in an unused area on the map. Often one corner can be set off for the legend. A border around the legend adds effectiveness to the total appearance.

3. *Inking in the features.* Colored inks may be used to plot the various features: black for hand-made features—roads, towns, stores; brown for contouring; blue for water; and green for vegetation. Red ink is used principally for outstanding points.

4. *Inking in names and reference data.* Simple block letters are the easiest to make and are the most legible. Black is the conventional color.

5. *Size of the lettering.* For classrooms, lettering should not be smaller than 1½ inches in height. A letter under 1½ inches is difficult

to see from the rear of most rooms. A 2½-inch letter is large. Lettering within this range can be used to emphasize the relative importance of the different features.

6. *Allowing ink to dry.* Probably one of the greatest sources of annoyance is the smearing of ink. It is advisable to ink in one complete feature at a time and let that dry thoroughly before putting in other details. Often instructors lose much time in removing ink smears because they commence to erase pencil and chalk marks before the ink is dry.

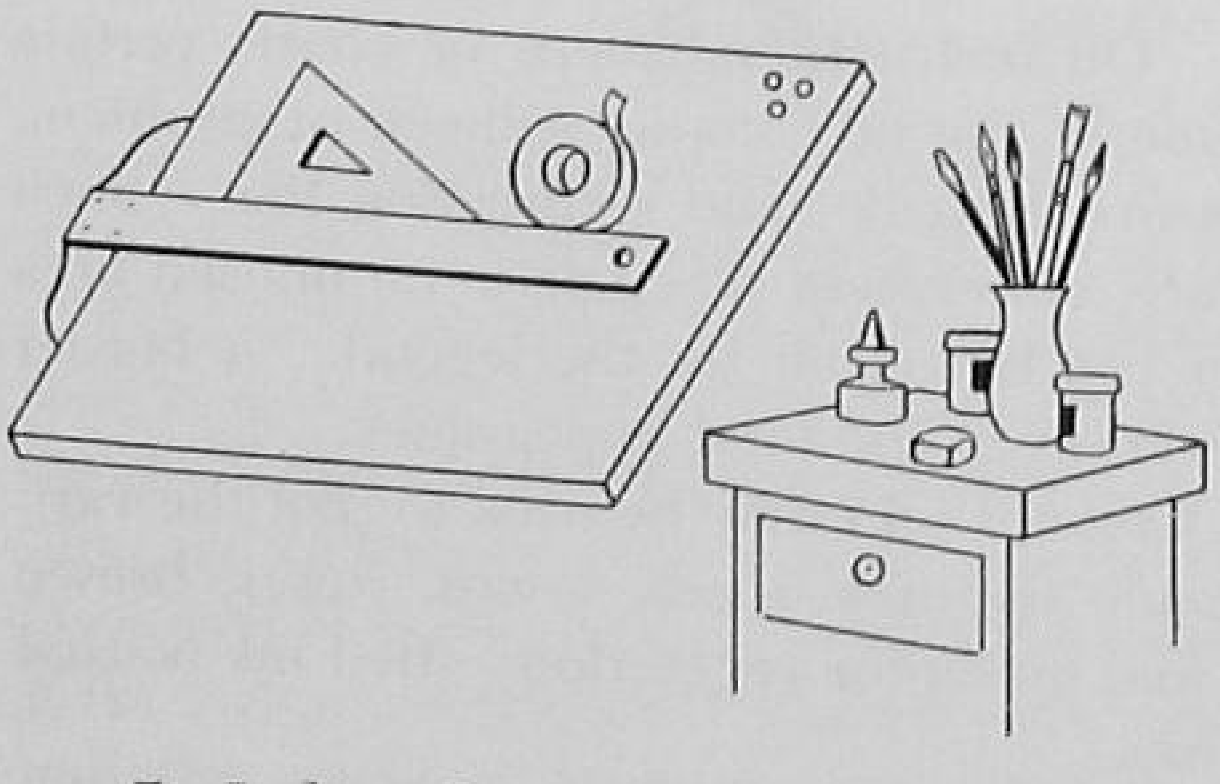
7. *Cleaning the enlargement.* The artgum eraser is used to remove pencil and chalk marks. In removing ink lines and smears, an ink eraser is often required, but white show-card color applied with a brush does the job faster. However, relining or lettering over show-card color requires expert experience, and is not recommended, since the ink smudges easily unless applied under certain conditions.

8. *Trimming the margin.* When a border is used, a margin of 2 to 3 inches is customarily left: this has the same effect as a frame on a picture.

9. *Movable symbols.* It will often be necessary to show movement on a map. By utilizing movable symbols which can be thumbtacked in proper place and moved as the situation develops, the student will follow the instructor's exposition. Effective is the use of movable arrows which can be tacked on a map to show points or locations which are under discussion. In short, by exercising ingenuity, an instructor, by the use of movable symbols, can vitalize what would otherwise be a dull map.

Equipment and materials for preparing maps. The following materials and equipment should be available in the visual aids section:

1. Drawing tables of the proper height, with large, smooth tops which can be adjusted to different angles.



2. Light table with glass top lighted from beneath.

3. Drawing boards.

4. Draftsman's stools and chairs.

5. T-squares, triangles, and engineer's and architect's scales.

6. Drawing instruments—compass, divider, and ruling pens.

7. India ink—black, blue, brown, red, and green.

8. Broad point and "speedball" pens.

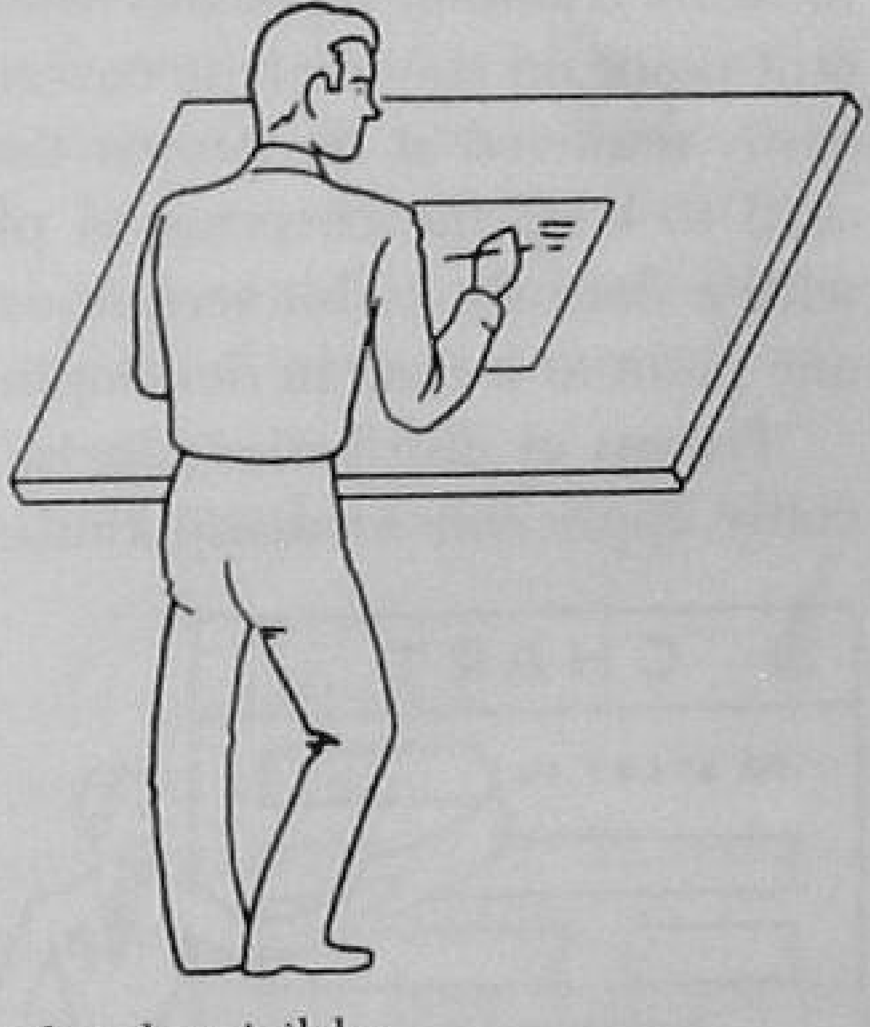
9. Show-card or poster paint—red, green, blue, yellow, black, and white.

10. Camel's-hair and bristle brushes.
11. Artgum, kneaded, and ink erasers.
12. Ball of strong twine.
13. Cake of carpenter's chalk.

This equipment is inexpensive when purchased ready-made; some of it can be homemade. Time spent in getting the proper drawing equipment is time well used in increasing the efficiency of your instructional program.

How to Make Charts for Teaching Purposes

For teaching purposes, charts are used chiefly to analyze a problem or situation. They show proper sequence and relationship. The flow chart, table chart, and process or distribution chart may adequately be used with many problems.



Flow chart. A knowledge of the organization of a business, for example, may be of interest and importance to the student. The chart should show each division of the business and its break-down into individual departments.

The student may be shown exactly where he fits into the picture. A personnel chart would start with the chief executive and go down the line. The flow of power and responsibility must be clearly visible.

In making a flow chart the following suggestions should be observed.

1. Use squares, rectangles, or circles for each breakdown.
2. Use lines to show the flow or direction.
3. Lay out chart with ruler and pencil. Fill in with ink or crayon later.
4. Title and captions should be clearly visible.
5. Make chart large enough to be seen easily. Show cards 22 by 28 or 28 by 44 inches are suitable for most classroom purposes.

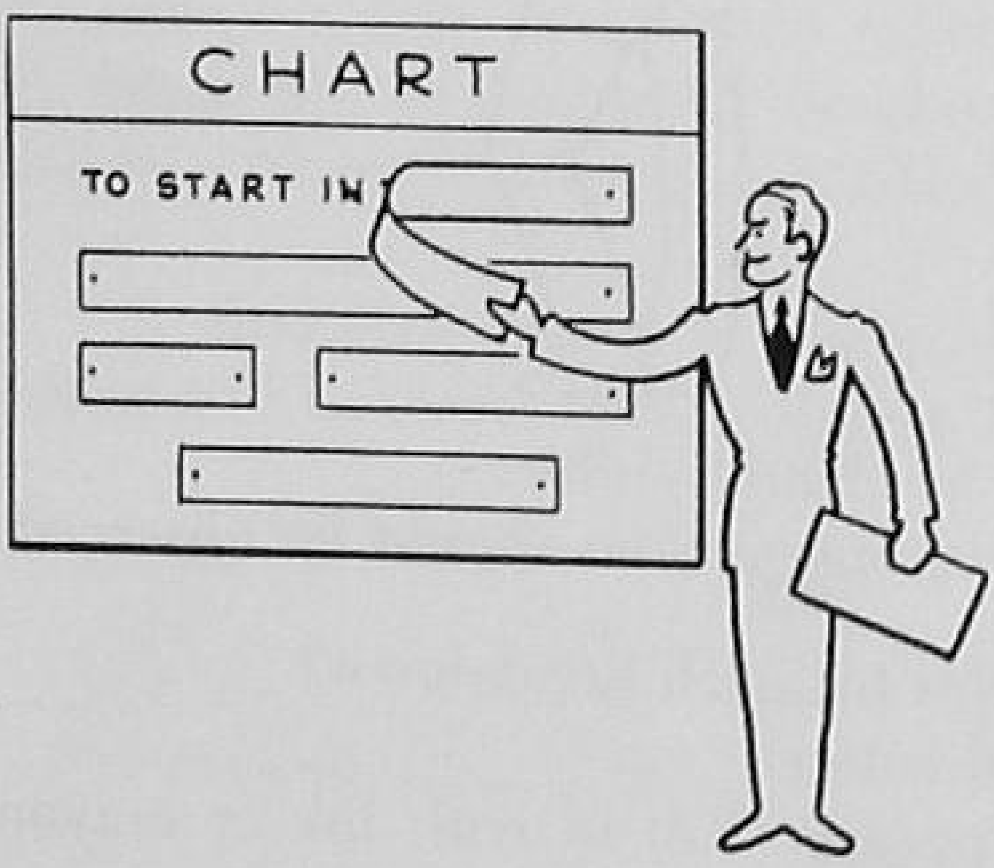
Table chart. The table chart is indispensable in many teaching situations. It is effective, for example, in presenting a breakdown of financial statements, such as the balance sheet or the profit and loss statement. It may also be used for comparisons or for listing advantages and disadvantages of a business or an organization.

When making table charts the following suggestions should be helpful:

1. Lay out chart with straight columns.
2. Make similar comparisons or give advantages and disadvantages on the same level.
3. Use ruler and pencil. Later fill in with ink, crayon, or paint.
4. Use illustrations whenever possible.
5. Titles and captions should be clearly visible.
6. Keep chart neat and attractive.
7. Make chart large enough for good observation. Show cards 22 by 28 or 28 by 44 inches are suitable for most purposes.
8. Do not overcrowd chart.

The strip-tease chart. The "strip-tease" technique has been successful in Army training, especially when presenting a table chart. Each important point on the chart is covered with a thin strip of paper that can be easily removed at the proper time. A small piece of scotch tape may be used to keep the covering in place. Remove the covering dramatically with a flourish. This technique is very helpful in focusing attention on one point at a time in developing a subject.

Process or distribution charts. Process or distribution charts are especially applicable to many kinds of instruction. They may, for example, illustrate the complete process of preparing a product for market or they may depict the channels of distribution of the various kinds of merchandise. Process or distribution charts are helpful aids in teaching subjects that deal with merchandise and agricultural products. The best sources for information are the individual makers or producers of the products. The Department of Agriculture, Department of Commerce, and other governmental agencies will also supply information dealing with processes or distribution for many kinds of enterprises.



The following general directions should be followed when process or distribution charts are made:

1. Present information in an original fashion.
2. Use illustrations whenever possible.
3. Make all titles and captions clearly visible.
4. Arrange all steps in proper sequence.

5. Use large sheets of paper or show cards large enough for each trainee to see.
6. Do not overcrowd.

How to Prepare Graphs for Teaching Purposes

Graphs not only are the language of statisticians, but also are effective tools for making comparisons and contrasts or for presenting complicated facts to students. A long column of statistics looks impressive, but is usually skipped over. However, an interesting graph on the same figures will arrest attention and make students stop, look, and think. Graphs which are involved or difficult to read are worthless. A good graph requires little explanation and tells its story at a glance.

Many instructional topics may be adequately presented with the bar graph, the "pie" graph, the line graph, and the pictorial graph.

The bar graph. The bar graph is easy to understand and simple to construct. It consists of bars arranged horizontally or vertically from a "zero" base. Size, length, or color of the bars represent the different values. Bar graphs are especially helpful in comparing or contrasting many subjects, such as quotas and sales, individual output, departmental production, and comparisons of income and wages.

The following suggestions for preparing bar graphs should be of practical value:

1. Work out the graph before doing the finished copy.
2. Use horizontal bars in preference to vertical ones.
3. Use a smooth surface sign card approximately 28 by 22 inches. If this is not available, ordinary brown wrapping paper will do.
4. Lay out graph with ruler and pencil. Fill in later with ink or crayon.
5. Leave ample space to the left of the zero line for all necessary printing.
6. Keep an even distance between bars.
7. Use vertical guide lines to facilitate reading the graph.
8. Number each guide line according to scale.
9. If using pictures, cartoons, or sketches, place them to the left of the zero line.
10. Use a brief, descriptive heading.

The "pie" graph. These graphs, as the name indicates, resemble a home-made apple pie. They are especially helpful where a "break-down" or distribution of values is important, such as the growth of various areas, or store operating expenses. A statement or an example takes on added meaning when it is presented in the form of a "pie" graph. A

vivid picture can be painted by coloring each section of the "pie" and placing the percentage number in each one.

Use the following suggestions for making a good "pie" graph:

1. Work out the percentages for the pie before drawing the finished copy.
2. Use a compass with a pen or crayon attachment. A protractor would be helpful in laying out the circle and measuring the degrees.
3. Use a smooth surface sign card approximately 28 by 22 inches. If this is not available, use ordinary wrapping paper.
4. Keep printing in sections straight and neat.
5. If possible, place the percentage number in each section.
6. Color the sections to make the graph more interesting.
7. Use a brief descriptive title.

The line graph. This graph is commonly used in industry, agriculture, and business, and is especially helpful in depicting economics and business cycles and trends.

The following suggestions will help the beginner to prepare line graphs:

1. Lay out and determine the scale for the graph before preparing the finished copy.
2. Use an adequate sized card. If this is not available, ordinary paper may be used.
3. Lay out graph with ruler and sharp pencil or crayon. Ink may be applied later.
4. Use faint horizontal and vertical guide lines.
5. Number guide lines to the left of the zero line, and below the base line.
6. Also put descriptive printing to the left of the zero line or below the base line.
7. Plot line carefully. If more than one line is required, use different colors.
8. Use a brief descriptive title.

The pictorial graph. Because of its great popular appeal, the pictorial graph has become an outstanding method of graphic presentation. The complete story is told with illustrations. The number or size of the illustrations conveys the proportionate amounts. What the pictorial graph lacks in exactness it makes up in effectiveness. Also, this graph is more difficult to make than the others, but the results are worth the effort. You may use pictorial graphs found in retail magazines, and individual pictures cut out of magazines and newspapers, or draw your own figures.

The following suggestions will help you prepare pictorial graphs:

1. Determine the most effective medium for conveying the thought. Usually the medium can be the object itself, such as money, a person, a farm, a building, a vehicle, or other illustrations.

2. Lay out graph, making the figure's proportions as accurate as possible.

Courtesy of Stix, Baer, and Fuller, St. Louis

On the left: Teaching new associates how time is kept at Stix, Baer, and Fuller by showing blow-up pictures of time sheet and time card.
On the right: The two most popular days in the store: Thursdays and Saturdays—pay days.
Both charts are correlated with the explanation of time and its relation to pay.

3. Use a series of figures to obtain greater accuracy and to facilitate comparison.

4. Use magazine cut-outs only when they are in correct proportion.

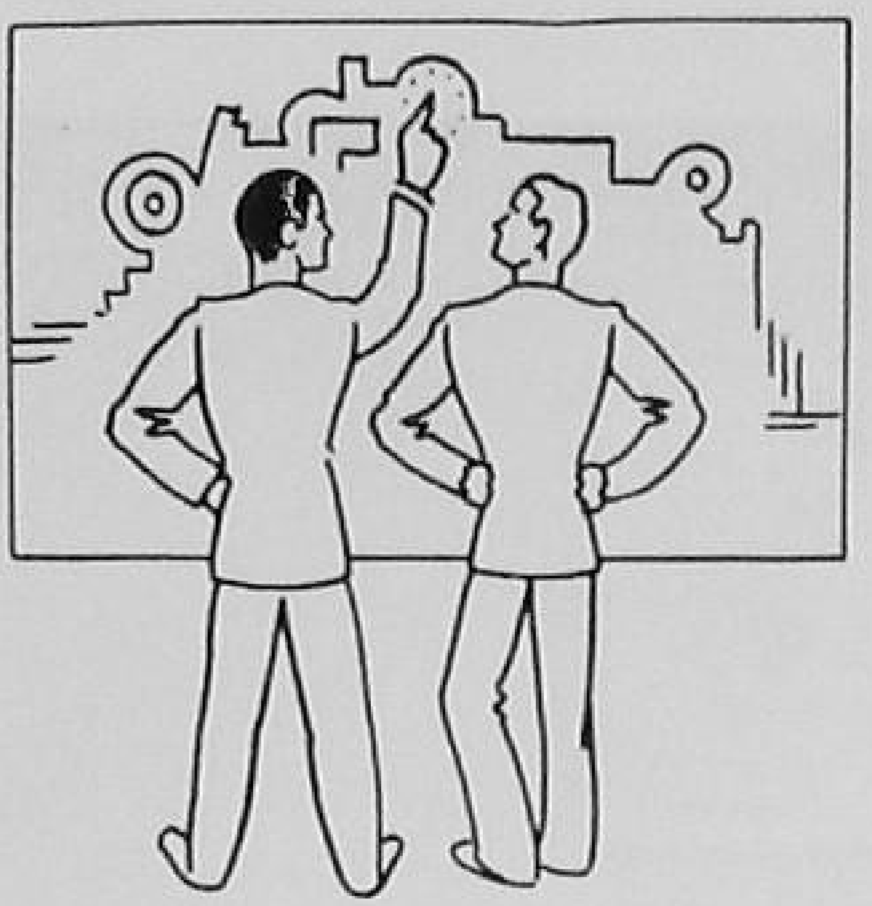
5. For extremely accurate work, have your local photographer prepare enlargements of your figure.

6. Place printing and percentages directly beneath the figures.

7. Use brief descriptive titles.

How to Make Diagrams for Teaching Purposes

A diagram may be nothing more than a line showing the progress of a product through an industrial plant, or it may be a highly technical drawing of thirty-story building construction or an illustration of how to operate certain appliances. Diagrams are becoming increasingly important in many kinds of instruction. Buyers are demanding more information and manufacturers are preparing more diagrams. The smaller diagrams may be projected on the blackboard or upon a large sheet of paper with the opaque projector and then traced lightly with chalk or pencil. The one on the blackboard may be developed later by the student, who might go over the light lines with a thicker chalk line. The diagram on the sheet of paper or show card may be filled in with ink or crayon.



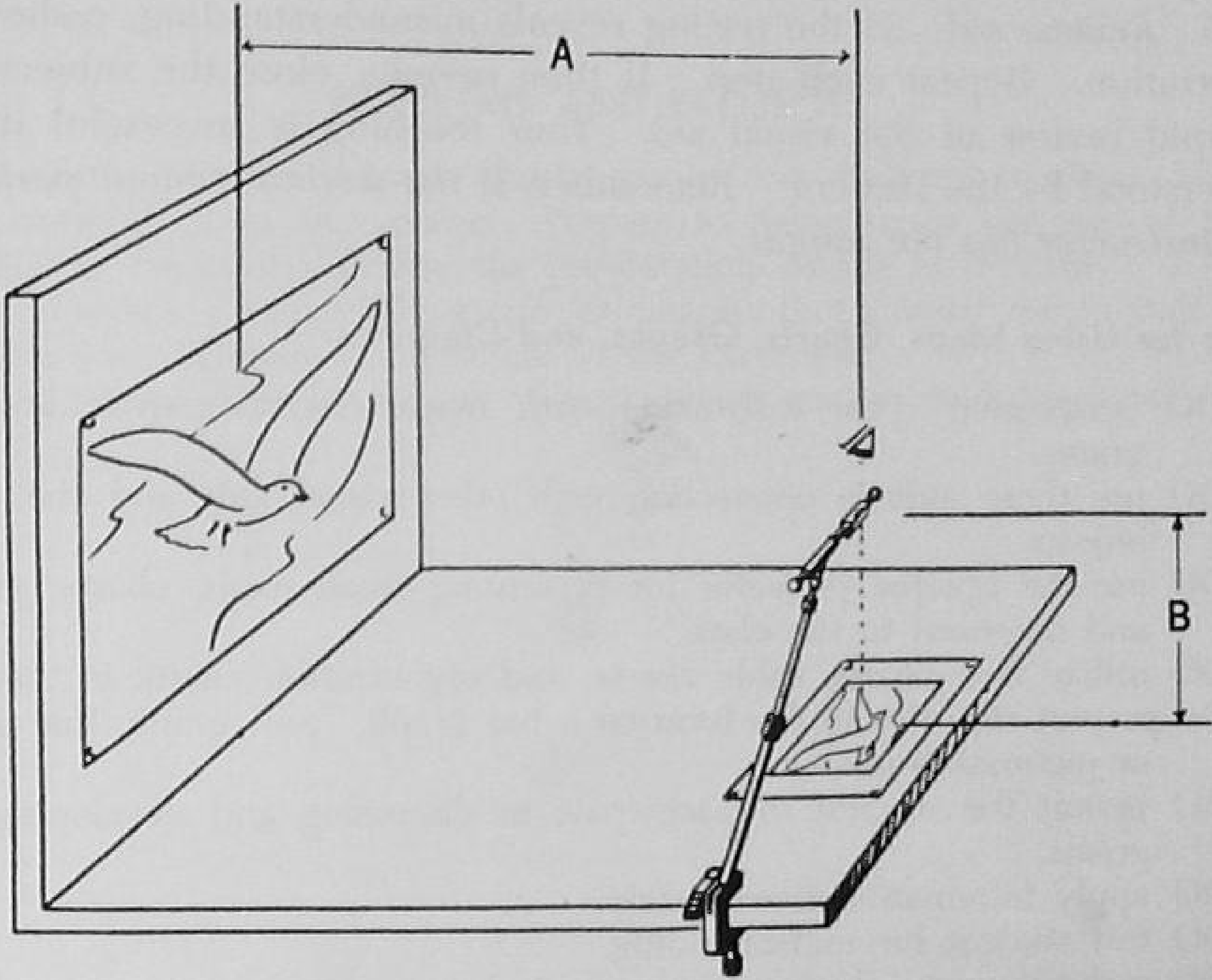
The following suggestions should be observed when preparing your own diagrams:

1. Prepare diagrams accurately to scale.
2. Make lines clean and eliminate all nonessentials.
3. Leave ample space between lines.
4. Use ruler, pencil, curves, and compass.
5. Make all titles and captions clearly visible.
6. Diagram should be large enough so that every student can see every part of it.
7. Diagram should be simple so that every student is able to understand it.

Claire-Vue Camera Lucida. This simple instrument, consisting primarily of metal tubes, an eye piece, and locking nuts, is very convenient to reproduce all types of maps, charts, graphs, diagrams, drawings, photographs, and three-dimensional objects. It can enlarge, reduce, or reproduce in equal size and in a normal or reversed image. The work to be copied is set on a vertical plane in front of the operator and the Camera Lucida appears to project it on a horizontal board or table top. The size of the image is governed by the distance between subject and eye piece, and the eye piece and drawing board. The image is accurate in detail, line color, and tone, thus enabling the student or instructor to trace the projected image and fill in with a similar color.

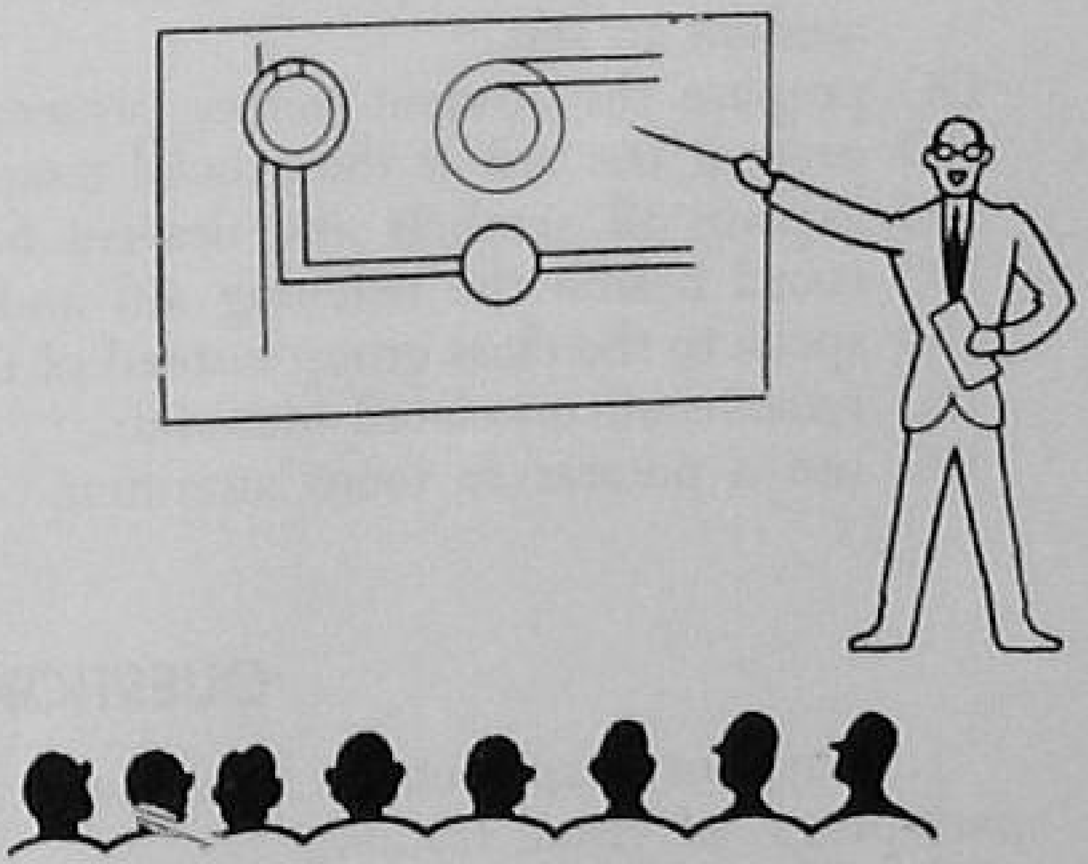
The Claire-Vue Camera Lucida and other accessories, such as the

Verti-Vue (which is an adjustable vertical copy board), may be obtained from the Optical Development Corporation, 5 Beekman Street, New York, N. Y.



Using the camera lucida to enlarge and reproduce a small drawing.

Presenting maps, charts, graphs, and diagrams in teaching situations. These visual aids are potent spark-plugs because they may be ignited at the crucial moment. Nearly all class sessions offer special opportunities for their use. The appropriate time to present the teaching aid is when the right opportunity presents itself. The instructor can strike when the iron is hot. *The following general procedure assures success:*



1. *Prepare student.* Tell the student why the aid is being presented, and point out the important points that he should observe.

2. *Present the aid to student.* When you believe that the student is ready, present the aid. In a clear-cut manner, explain the illustration and point out each important step in the proper sequence.

3. *Apply information.* Apply the teachings of the aid immediately in the development of a skill or to present information, as the case may be.

4. *Test student.* After the aid has been presented, the student should be tested, either orally or in writing, to see if he understands the information presented.

5. *Review aid.* If the testing reveals misunderstanding, reshow the illustration. Repeat each step. If time permits, close the subject with a rapid review of the visual aid. Your teaching is successful if it is understood by the student. Remember, *if the student cannot perform—the instructor has not taught.*

DO's for Using Maps, Charts, Graphs, and Diagrams

DO "spark-plug" your instruction with maps, charts, graphs, and diagrams.
DO use these aids in connection with other visual aids and the actual objects.
DO use the opaque projector for presenting small maps, charts, graphs, and diagrams to the class.
DO utilize flow charts, table charts, and organization charts in teaching.
Do present statistics in the form on a bar graph, "pie" graph, line graph, or pictorial graph.
DO permit the student to participate in discussing and developing diagrams.
DO apply information immediately.
DO test student for understanding.
DO reshow maps, charts, graphs, and diagrams to clear up misunderstandings.
DO follow up instruction by displaying the aid on the bulletin board.
DO make your own maps, charts, graphs, and diagrams large enough for observation by the whole class.
DO make titles and captions clearly visible.
DO exhibit maps, charts, graphs, and diagrams high enough for every student to see.
DO prepare the student before presenting aid.
DO present the aid at the crucial moment.
DO explain all symbols and devices to the student.
DO stand beside the teaching aid and not in front of it.
DO speak to the class group instead of the teaching aid.
DO remove all unrelated material.
DO use a pointer to focus attention.

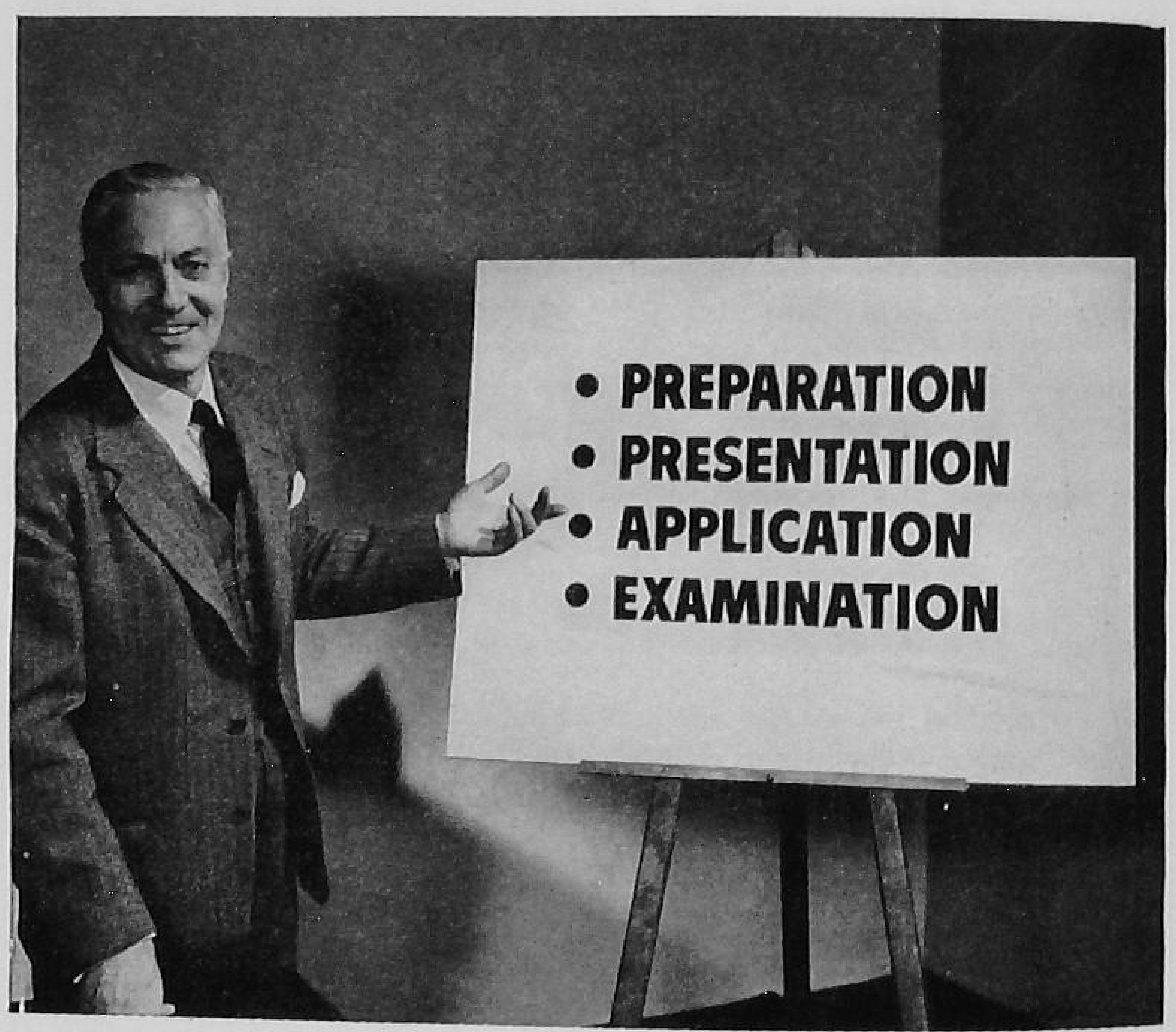
QUESTIONS

1. Why are maps, charts, diagrams, and graphs sometimes called the "spark-plugs" of visual training?
2. What are the steps in making a map?
3. What are the steps in enlarging a small sketch?
4. How is enlarging by projection done?
5. What equipment and materials are needed for preparing maps?
6. What are the names of the different kinds of charts?
7. How are "strip tease" charts used? Demonstrate.
8. What are the names of different kinds of graphs?

9. What are the advantages of each kind of graph?
10. What are "diagrams"?
11. What five steps are employed in using these visuals in a training situation?

PROBLEMS AND PROJECTS

1. Bring samples of maps, charts, graphs, and diagrams to class. Secure these materials from any source. Prepare to demonstrate the uses of these materials to the class. Follow the presentation outline in the text.
2. Prepare a map, chart, graph, or diagram that you can use in your area of instruction. Demonstrate its use in the classroom.
3. List the "Do's for the use of maps, charts, graphs, and diagrams."



Courtesy of Syndicate Store Merchandiser

A pertinent flash card.

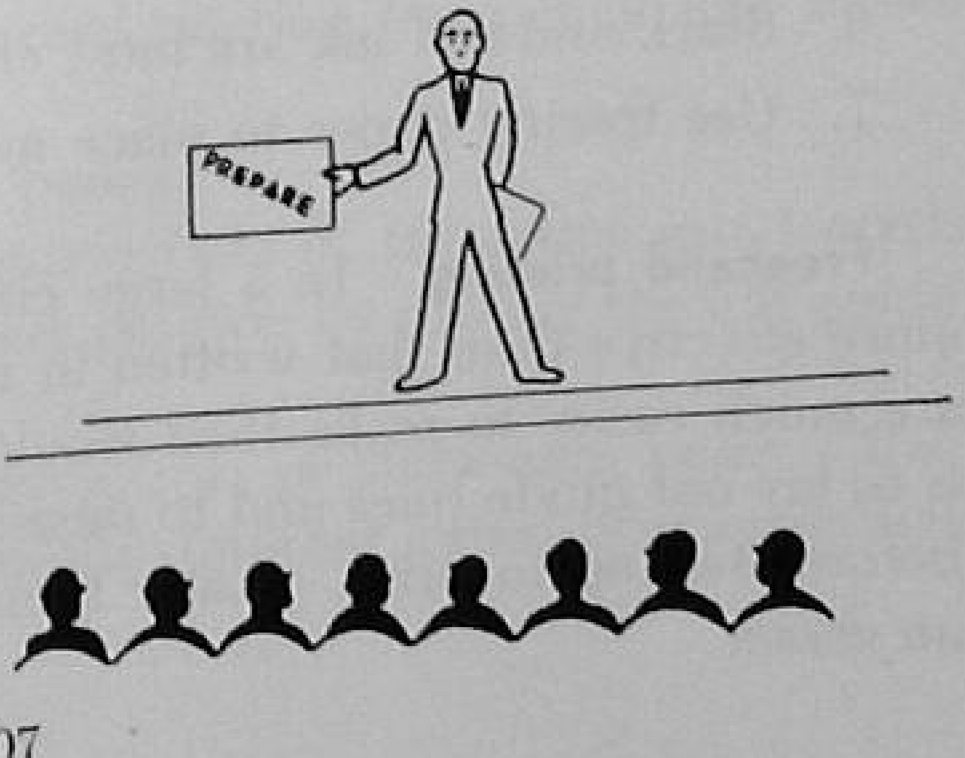
Flash Cards and Flannel Boards

It is said that lightning never strikes twice in the same place, but instructors can strike repeatedly at the understanding of students by the use of flash cards.

Flash cards are small compact cards, approximately 10 by 12 inches, which are "flashed" before a class to bring home an idea. The message the cards contain is brief and to the point. The cards may also be used effectively in a drill or review.

How to Use Flash Cards

In general, the same steps of presentation that apply to other, similar visual aids are applicable to flash cards. These steps are: (1) prepare student, (2) present flash card, (3) apply information, (4) test student, (5) review.



Because of the compact size, pertinent contents, and style of presentation of flash cards, they may be used effectively in a large number of situations. The technique to be employed will depend upon the specific problem or sub-

ject that is being presented. Flash cards may also be used to advantage with other training aids, such as large posters, charts, maps, graphs, and diagrams. *Be sure to expose each card so that every one of the students can observe it.*

How to Prepare Flash Cards for Teaching

Simple flash cards. A simple flash card may be prepared by writing or printing the contents on a plain sheet of paper or card. Ordinary wrapping paper, light-colored construction paper, discarded signs, or sections of a cardboard box make good flash cards. An ideal card may be prepared by cutting a large sheet of show cardboard (28 by 44 inches) into eight pieces, 11 by 14 inches each. A large sheet of show cardboard can be obtained for approximately twenty-five cents.

Lettering may be applied to the flash card by (1) written or script form, (2) free-hand printing, (3) commercial printer, (4) stencils, (5) stencil cut-outs, (6) cut-out letters, and (7) rubber stamp sets. Unless a large number of similar flash cards are required, commercial printing may be too expensive. However, the other methods will serve the same purpose, and with a little care you can prepare excellent flash cards.

Written or script. This is the simplest form of lettering. The information is carefully written on the flash card in long-hand. The following suggestions will help make your card more attractive:

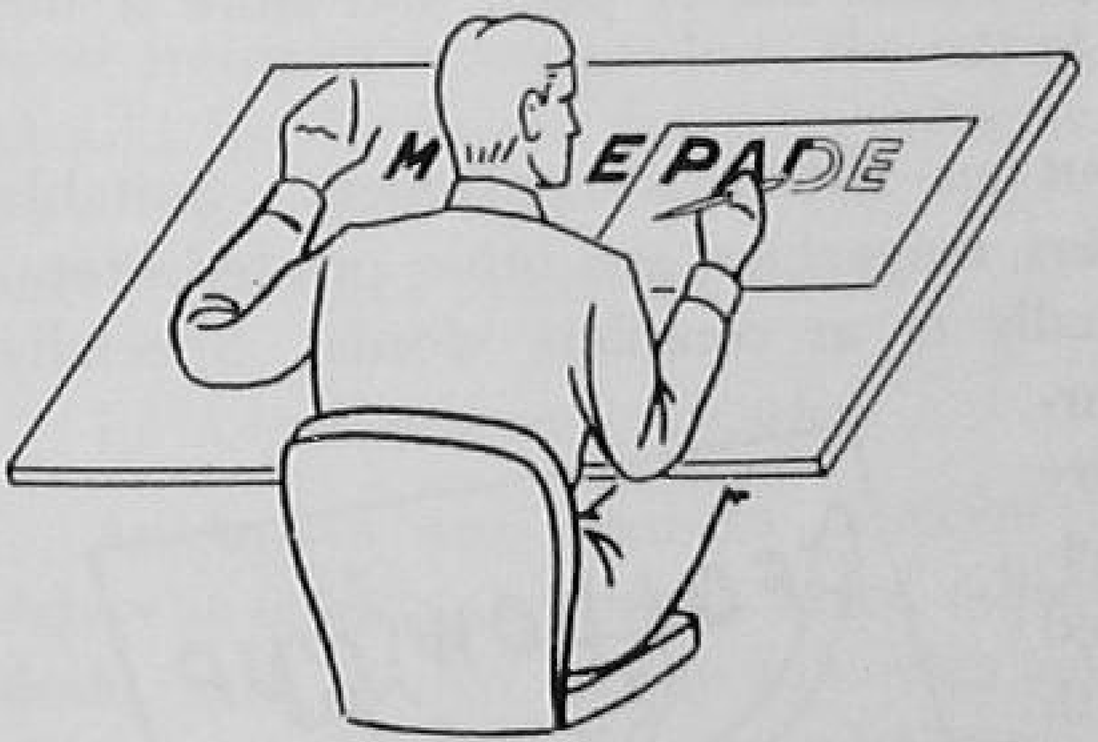
1. First make a rough draft on ordinary paper.
2. Rule guide lines.
3. Lay out flash card in pencil, and then trace with ink or crayon.
4. Use a speedball pen with a thick point.
5. Make your writing approximately 2 inches high.
6. Black and red ink are most effective.
7. Use tracing paper to place more intricate material on flash cards.

Freehand printing. In a large class room, printed material is usually more effective than that written in script. Freehand-printed flash cards are much easier to make than would appear at first glance. The secret is to lay out guide lines and to measure and rule off space for each letter before starting to print. Later these guide lines may be removed with an eraser.

Use the following suggestions for attractive flash cards:

1. Center flash card roughly on an ordinary piece of paper.
2. Rule guide lines, and lay out blocks for each letter. Draw lines lightly with pencil.
3. Print content in pencil.
4. Trace with ink or crayon.
5. Use a speedball pen with a thick point.
6. Use dark colors. Black and red are the most effective.
7. Transpose intricate material to the flash card with tracing paper or by placing the original paper on the flash card and tracing the content with a stylus. Use of a stylus will make a slight impression on the flash card. For best results, the master paper must be thin, otherwise a piece of carbon should be used between the master sheet and the flash card.

Stencils. A particularly attractive flash card may be made by the use of an alphabet stencil, which may be purchased at most stationery counters for ten to fifty cents. A lettering set consisting of letters, numbers, and figures, 1½, 1, ¾, and ½ inch in height may be purchased for approximately one dollar. Most stencil sets contain a left and right guide hole above each letter to provide for correct spacing.



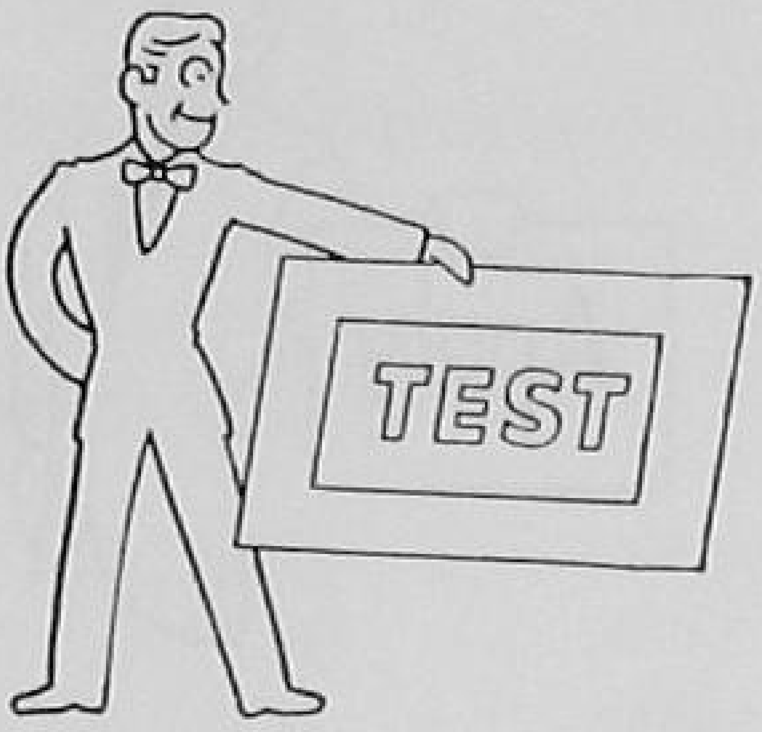
Use these stencils in the following manner:

1. Lay out flash card on an ordinary sheet of paper. This will help you to center the printing on the finished card.
2. Rule guide lines lightly on the flash card with pencil.
3. Place the stencil on the flash card, so that the pencil line shows through the guide holes.
4. Trace each letter with a sharp pencil.
5. Put a small dot in the right guide hole of the letter just traced. The following letter is put in the correct position by placing the left guide hole over this dot.
6. Fill in outline with pencil, crayon, ink, or show-card paint. Use a speedball pen or brush that will form the different letters of your stencil without unnecessary remodeling.

7. Use bold colors. Opaque colors are best for use with pen and brush.

8. Erase all guide lines and dots with soap or artgum eraser.

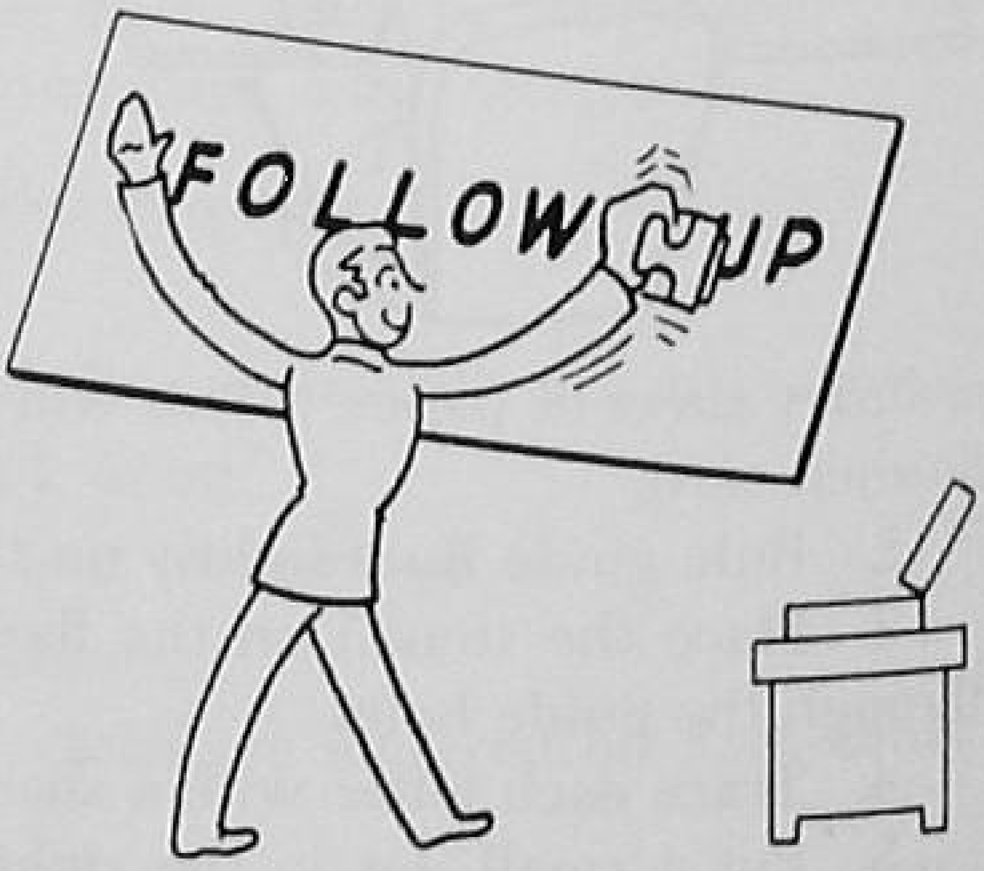
Stencil cut-outs. A stencil cut-out should be prepared if several similar flash cards are required. Stencil paper, which has a waxy finish to prevent ink or paint from spreading when it is applied to the stencil, may be purchased at most art-supply or stationery stores. After the stencil is cut, place it on flash card and fill in the letters. You may use pencil, crayon, ink, or show-card paint. A superior job can be done by applying special paint with a small atomizer.



Use the following suggestions for cutting a stencil:

1. Prepare lettering on a piece of paper the same size as the flash card.
2. Use a square-type Roman letter.
3. Place stencil paper over lettering and trace it with a sharp pencil.
4. Carefully cut out letters with a single-edged razor blade.
5. After using stencil, wipe off excess ink or paint and store it between sheets of absorbent paper.

"Cut-out letters." Use of cut-out letters is convenient. Suitable letters may be cut from newspapers, magazines, and other printed literature, and may be used individually or as complete words. Specially prepared letters may also be purchased at most art and stationery counters. First arrange all the letters on the flash card in the desired order before attaching them with paste or glue.



Rubber stamp sets. An attractive flash card can be prepared in a jiffy by the use of a stamping pad and a rubber stamp set. A complete set consisting of 1⅜-inch capitals and numbers, 1¼-inch small letters, symbols, ruler, spacer, stamping pad, and ink may be purchased for approximately five dollars at most art-supply and stationery stores. The width of the rubber stamp varies, but with a little practice the letters may be applied directly to the flash card with the use of the ruler and spacer. However, detailed flash cards should be arranged in advance.

Follow these suggestions for a more attractive job:

1. Lay out lettering on a piece of paper the same size as the flash card.
2. Draw a light guide line with pencil, or use the ruler and spacer for an even line.
3. Ink the pad sufficiently with rubber-stamp ink before using.
4. Press stamp firmly into pad before applying it to the card.
5. Determine the exact position of letter before pressing it down on the card.

Complicated lettering is not necessary: simple letters are the most effective. However, an instructor possessing originality will find many ways of utilizing color combinations, arrows, dots, lines, and other figures to increase the attractiveness and effectiveness of his flash cards.

Examples of Flash Cards

English usage. Poor English is always a detriment. Many common errors in the use of English may be avoided by planned instruction. The use of the flash-card technique is effective with these job problems and avoids embarrassing a student. Cards upon which are written the most frequent errors made in the use of English may be prepared. Sets should be developed for job problems in (1) adjectives and adverbs, (2) "was" and "were," (3) "says" and "said," (4) "don't" and "doesn't," and (5) double negatives.

1. *Adjectives and Adverbs.*

Adjectives are used to describe or modify nouns or pronouns. Adverbs modify or change verbs, adjectives, or other adverbs. Prepare flash cards similar to the following and ask the student to select the correct word appearing in parentheses:

THE CUSTOMER WALKED (SLOW, SLOWLY) UP THE STEPS.

2. *"Was" and "Were."*

"Was" is used with the pronouns "I," "he," "she," and "it," and with singular nouns. "Were" is used with the pronouns "you," "we," and "they," and with plural nouns. Prepare flash cards similar to the following and ask the trainee to use the correct word:

______ YOU OUT YESTERDAY?

3. *"Says" and "Said."*

"Says" is frequently confused with "said." "Says" is used in the present tense, "said" in the past tense. Prepare flash cards similar to the following and ask the trainee to supply the correct word:

> SHE ALWAYS ________ "GOOD MORNING" THE MINUTE SHE ENTERS THE DEPARTMENT.

4. *"Don't" and "Doesn't."*

Use "don't," with pronouns "I," "we," "you," and "they," but never with the pronouns "he," "she," or "it." "Don't" is the contraction of "do not," and "doesn't," the contraction of "does not." When in doubt, test yourself. "Don't" may be used wherever "do not" is correct. Prepare flash cards similar to the following and ask the trainee to supply the correct word:

> JANE LOOKS WELL IN THAT HAT. ________ SHE?

5. *Double Negatives.*

Two negatives in the same sentence usually make the meaning positive. "Bill didn't have no money" means, "Bill *did* have some money." The sentence should read, "Bill did not have any money" or "Bill had no money." Prepare flash cards similar to the following and ask the student to give correct sentences for each:

> YOU AREN'T NOWHERE NEAR THE ELEVATOR.

Basic arithmetic. The use of flash cards lends itself readily to the teaching of basic arithmetic. Students of all ages learn much more quickly when flash cards are employed to teach (1) fundamentals, (2) common fractions, (3) decimals, (4) percentage, (5) linear, weight, dry, liquid, and other forms of measurement.

Flash cards add zest and interest to arithmetic drills. A sufficient number of flash cards can be developed for each topic to give the student ample practice. Each arithmetic problem can be made pertinent and simple. When necessary, the trainee may use pencil and paper to solve problems. Placing the correct answer on the reverse side of the flash card will facilitate checking by the instructor. Use easy problems at first, gradually working up to the harder ones.

Increasing the tempo of presenting the flash cards to the student will also improve his ability. The following flash cards are examples from each set of topics:

ADD	SUBTRACT	MULTIPLY
$1.26	$5.00	$.18
.45	2.87	6
.11		
———	———	———

Industrial organization. Topics that deal with the organization of an industrial plant may be successfully handled with a large organization chart and flash cards. The ideal chart would be constructed out of the individual flash cards, fastened into lines and blocks from which the cards could be removed at will. However, if the chart is not constructed along these lines, a flash card may be prepared that corresponds to each division and classification on the organization chart.

The problem should be developed through the use of the chart. If the chart is of the skeleton type, follow through by removing the flash cards and asking the trainee to replace them in the proper positions. Cover or turn around a blank chart, and then distribute the corresponding flash cards and ask the trainee to place them on the bulletin board in the proper arrangement.

An interesting project may be developed in the classroom by distributing the flash cards to the students and then asking each to exhibit his flash card to the group and tell what his duties would be. Then permit the student to place the flash card in its proper position on the chart on the bulletin board.

Types of customers. The ability to determine types of customers enables the salesperson to serve more satisfactorily. All customers are humanly different, and their moods are subject to continual change. While snap judgments should be avoided, the classification of customers into "types" is very helpful. Flash cards can be prepared for each type of customer. Ask the students to tell what they will need to handle that type of customer. Place the correct answer on the reverse side of the flash card to facilitate procedure.

The National Cash Register Company lists the following types of customers and suggestions for handling them:

FOR CUSTOMERS WHO ARE TIRED AND CROSS YOU WILL NEED ———	PATIENCE
(front)	(reverse)
FOR CUSTOMERS WHO ARE FUSSY AND NERVOUS YOU WILL NEED ———	CONSIDERATION
(front)	(reverse)

Job instructor training—JIT. Flash cards have been used effectively in presenting job instructor training. At least six flash cards, one for each meeting, should be prepared. The outstanding objective of each meeting should be carried over from the blackboard to a flash card, which should not be presented to the group until the information has been developed on the blackboard. After the material has been erased from the blackboard, it may be referred to by exposing a similar flash card to the group. Review the topic by pointing to each step on the flash card and have the group read it aloud.

If the meetings are being held weekly, it is very helpful to refresh the mind of the student by presenting the flash cards for each previous class before starting a new class.

At the last class, arrange the room so that the six flash cards can be displayed in a prominent place. Arrange them in the same order in which they were presented. Before the final class ends, point to each flash card and read it to the class. Start with the last one and close the class by reading the first card.

First Class:

IF THE INSTRUCTOR
HAS TAUGHT
THE WORKER
CAN PERFORM

Second Class:

FOUR BASIC STEPS:
PREPARE
PRESENT
APPLY
TEST

Third Class:

RELATIONSHIPS	
SELLING	TRAINING
1. APPROACH CUSTOMER	1. PREPARE TRAINEE
2. PRESENT MERCHANDISE	2. PRESENT INFORMATION
3. CREATE DESIRE	3. APPLY NEW SKILL
4. CLOSE SALE	4. TEST TRAINEE UNDERSTANDING

Fourth Class:

LAWS OF LEARNING:
READINESS
INTEREST
EFFECT
PREPARATION
REPETITION

Fifth Class:

FOLLOW UP AND SUPERVISE
OBSERVE
RATE
RETRAIN
COMMEND

Sixth Class:

FOUR SKILLS
HOW TO GET READY
HOW TO ANALYZE A TASK
HOW TO INSTRUCT
HOW TO FOLLOW UP

Human relations instruction. For many supervisors, the most difficult part of their job is acquiring the ability to work effectively with people. This ability is vital to good supervision because every act and decision of the supervisor has a bearing in one way or another on the attitude, morale, and efficiency of employees. Human relations training is a practical way of helping supervisors develop skill in getting satisfactory results through the people they supervise.

Although the instructor of a class studying human relations will adhere to a carefully prepared outline, flash cards based on the necessary blackboard work are very helpful. To implement this kind of teaching, the following flash cards have been developed by Harold W. Thomas, Supervisor of Distributive Education of the Commonwealth of Pennsylvania.

A SUPERVISOR'S FIVE NEEDS

- Knowledge of the work
- Knowledge of responsibilities
- Skill in instructing
- Skill in improving methods
- Skill in leading

THIS IS YOUR JOB!

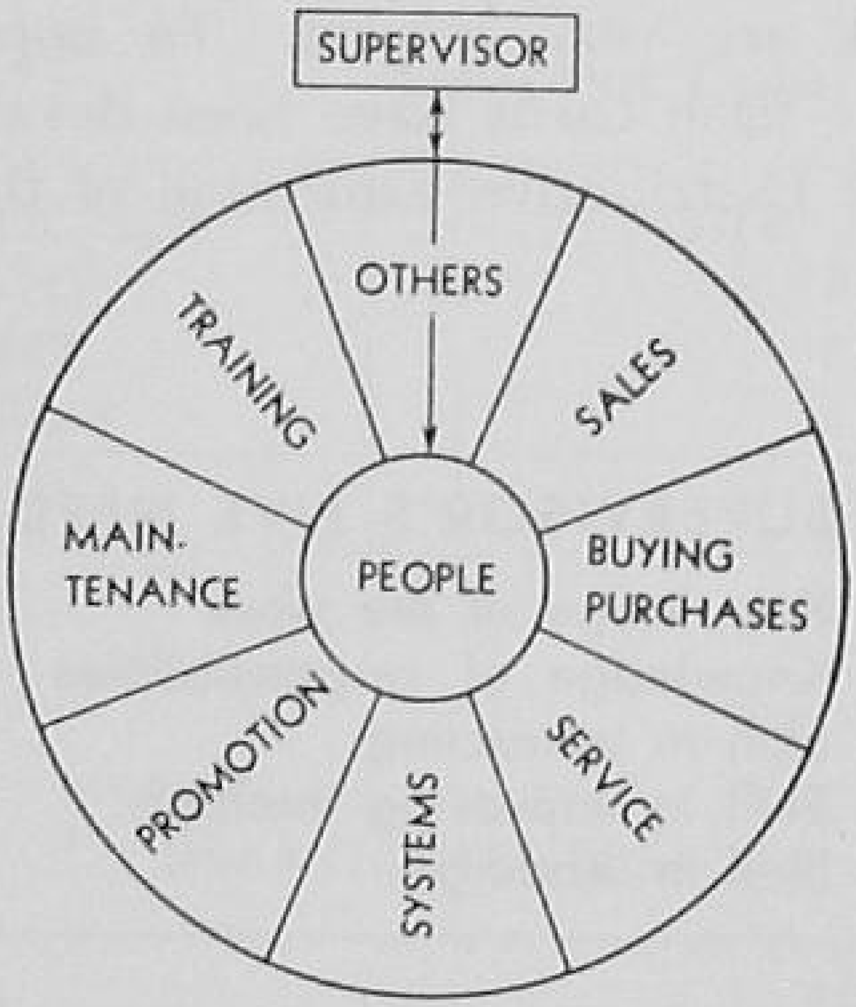
1. To MANAGE
   When you plan the use of workers' merchandise and equipment
2. To SUPERVISE
   When you have workers carry out your plans
3. To INSTRUCT
   When you teach workers to execute your plans

ASK YOURSELF THESE QUESTIONS

THE EMPLOYEE

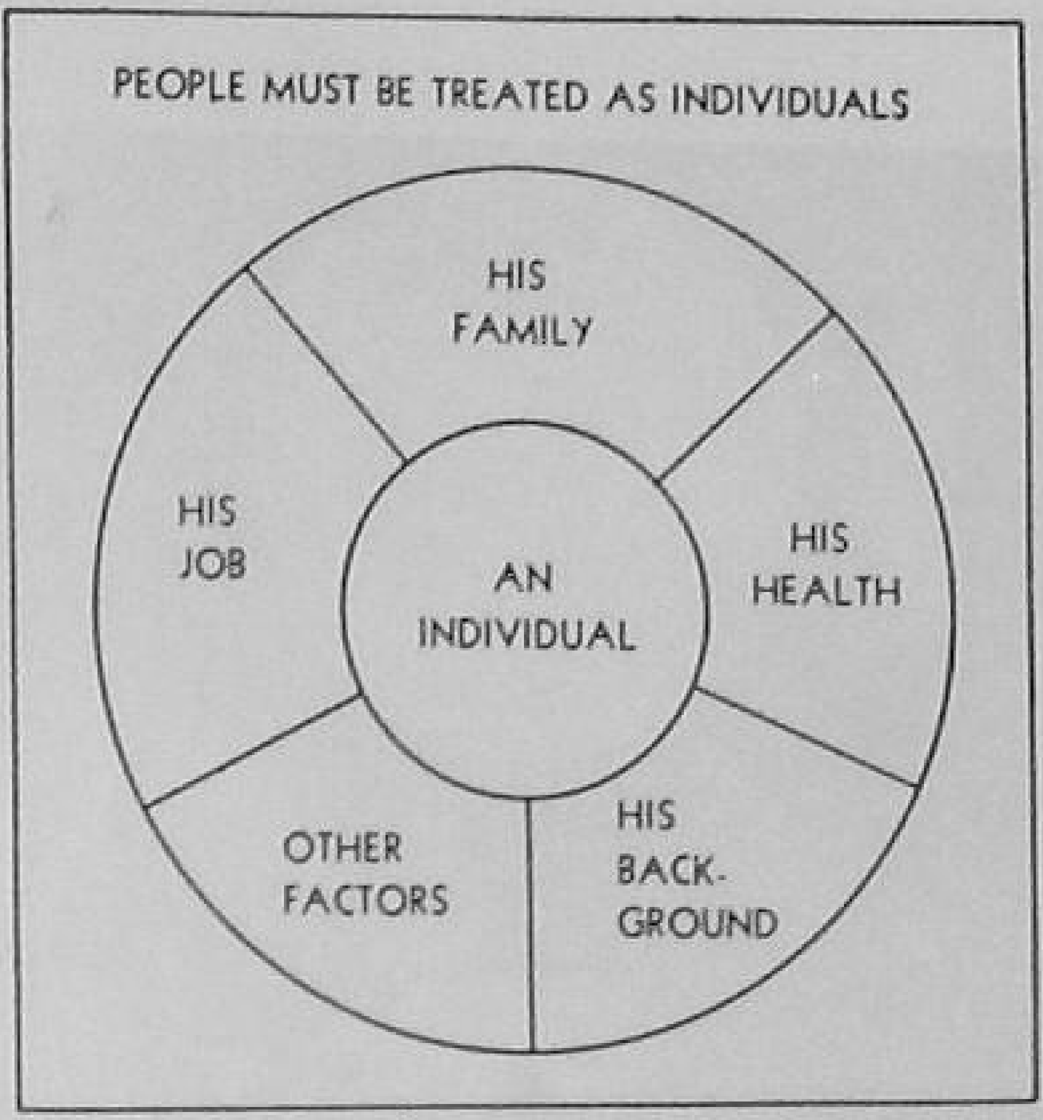
1. Is he "doing a good job"?
2. Does he fail to understand instructions?
3. Does his attention wander from the job?
4. Is he interested in his job?
5. How does he respond to recognition?
6. Is he self-reliant?
7. Does he seem poorly adapted to the job?
8. Does he get along well with the other people in the department?

A SUPERVISOR GETS RESULTS THROUGH PEOPLE



FOUNDATIONS FOR GOOD RELATIONS

1. Greet workers in a friendly manner
2. Let each worker know how he is getting along
3. Give credit when due
4. Tell people in advance about changes that will affect them
5. Make best use of each person's ability



HOW PROBLEMS ARISE

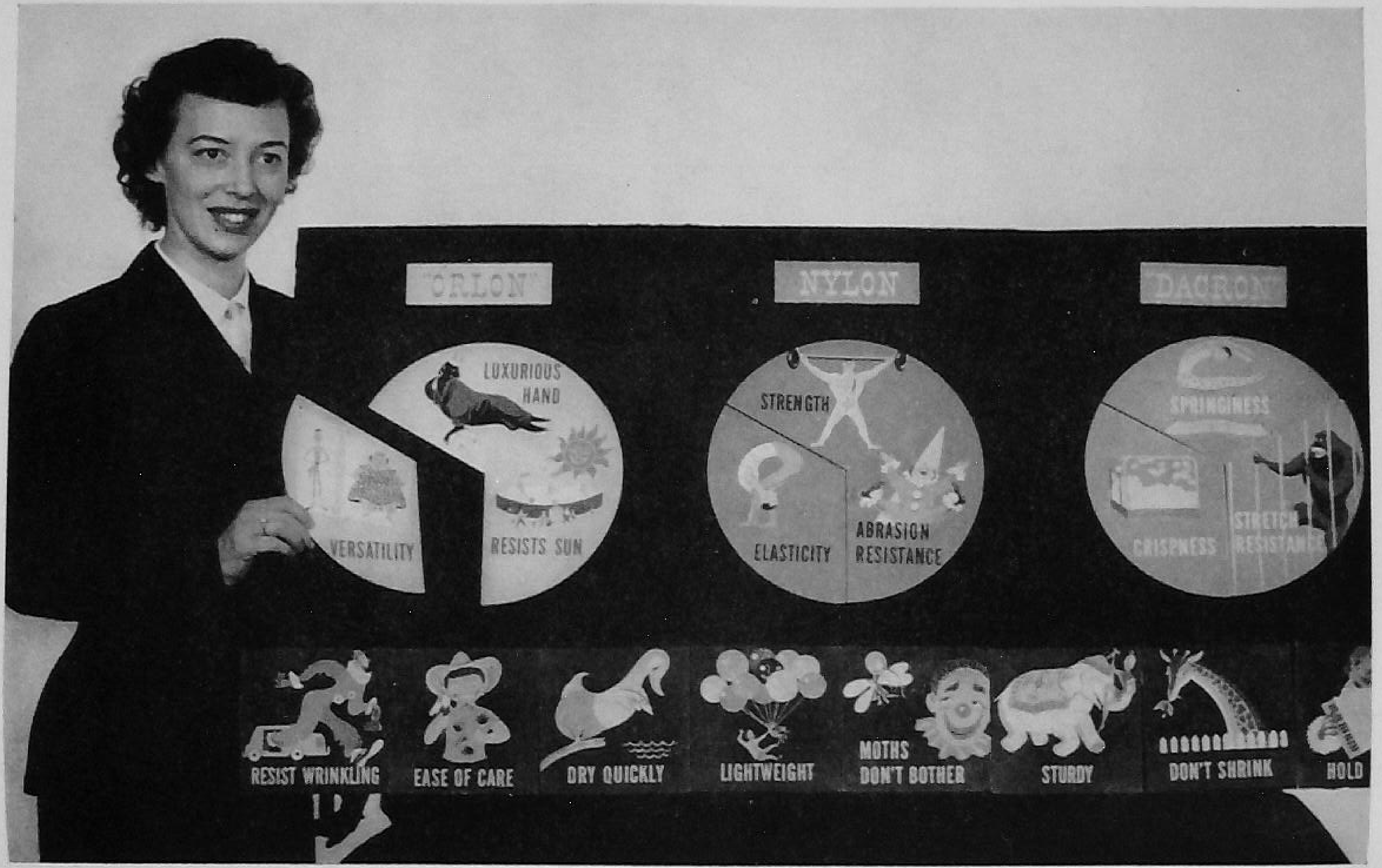
1. You run into them
2. They are brought to you
3. You sense an attitude change in your department
4. You anticipate them due to policy changes

HOW TO HANDLE A PROBLEM

1. Get the facts
2. Weigh and decide
3. Take action
4. Check results

WHAT THE FOUR-STEP METHOD WILL DO FOR ME

1. More confidence in ability to handle people
2. Better standing with my employees
3. Better standing with my management
4. Fewer job headaches
5. Less criticism
6. Organized plan to follow
7. Save me time



Courtesy E. I. du Pont de Nemours & Co.

The flannel board is a dynamic teaching tool in the hands of a capable teacher.

HOW TO GET
OPINIONS AND FEELINGS

Don't argue
Encourage him to talk about what is important to him
Don't interrupt
Don't jump at conclusions
Don't do all the talking yourself
LISTEN

THE EFFECTS OF
GOOD SUPERVISION

1. Improve YOU on the job
2. Give returns to YOU, your DEPARTMENT, and your COMPANY

Flannel Boards

The flannel board technique has become more important in recent years. It is no longer the small green felt-covered board on which teachers would place various "cut-outs" such as pictures, words, or numbers in the kindergarten class and lower elementary grades. Today it has become a dynamic teaching tool, used by an increasing number of alert educators and industrial representatives.

The flannel board still is a stationary or portable surface covered with a rough flannel-like cloth, usually grey, black, or dark blue in color. Various objects such as pictures, magazine or newspaper "cut-outs," graphs, drawings, text material, and other illustrations with similar rough "flannel-like" backing are placed on the board as the presentation is developed by the instructor. The objects placed on the board adhere to it, without the use of thumb tacks or scotch tape. This makes it possible to construct and develop an idea step-by-step in a very dramatic and impressive manner.

Another outstanding feature of the flannel board presentation is its flexibility. The flannel board presentation may be designed around any size board, depending upon the amount of material to be covered and the time allotted for the presentation. After the presentation has been developed it may be shortened or lengthened, depending on the nature of the group or purpose of the meeting. New materials may be added and outdated material deleted. Color may be used to attract and focus attention. In fact, entire sections of the presentation may be revised in order to provide a more effective lesson.

How to Use Flannel Boards

The learning situation will determine how the flannel board is to be used. Both the characteristics of the group and the nature of the material to be covered will determine the specific techniques used by the instructor. However, most flannel board presentations will be based on the following four steps: (1) preparation, (2) presentation, (3) application, (4) testing.

In preparing the flannel board presentation, it is essential that you carefully plan each step of the presentation. A detailed written guide should be developed; the flannel board material should be prepared around this guide. After the material has been developed, you should rehearse the presentation until you are certain that you can cover the material in the time allotted. Practice your timing and pacing, and visualize each complete board before starting your lesson. Make sure you have all flannel board cards arranged in the proper order and placed around the board or on a near-by table so that they will be accessible with a minimum of movement. Allow yourself at least half an hour to set the board up and arrange cards before you start the meeting. At the beginning of the meeting, it is essential that you stress the purpose and importance of the meeting, and tell the members of the group how they will benefit by it. The first few cards you place on the flannel board should assist you in arousing the interest of the group.

After you have aroused their interest, you then present the information in a step-by-step manner. Use your cards in a dramatic way, but make sure that each point is clearly presented to the group. In some cases, it might be wise to take an extra minute or two to clarify a point. However, the presentation should be prepared and presented in such a way that it will not be necessary to deviate from the original guide too frequently.

Whenever possible, the lesson and guide should be prepared so that the group can discuss points in the lesson and directly apply the information to their own problem. This is a very important step. Each member of the group should be encouraged to solve their problem by applying the information in the lesson.

In order to evaluate the effectiveness of your presentation, you will find it advisable to check the understanding of the group. This may be accomplished by giving a short written test, an objective test, or any other type of instructor-made check list at the end of the presentation. Some instructors have successfully used the evaluation technique of having several members of the group orally evaluate the presentation at the close of the meeting. Other instructors using the flannel board have closed the meeting with a review of the key points on the board. In some cases group responses have been checked as the cards were removed, with a

flourish, from the board. With practice, the instructor will be able to gear his flannel board presentation to the level of the group.

Example of a Flannel Board Presentation Used in Business

The flannel board presentation developed by the Textile Fibers Department of E. I. du Pont de Nemours and Company, was based on a circus motif. It was designed to help get across accurate and usable sales information to personnel about du Pont's five fibers—rayon, acetate, nylon, Orlon acrylic fiber, and Dacron polyester fiber.

Since the general fund of information about rayon and acetate is greater than that about the last three fibers, the presentation concentrates on Orlon, Dacron and nylon, providing an interesting and unusual visual aid for talks about the easy-living characteristics of these fibers.

A complete kit, for use by retail stores, has been made available by du Pont at a unit price of $9.95, or less than the cost of the materials. It includes a three by four-foot piece of black flannel, a complete set of cards, a script, a set of directions, and a number of reference booklets.

A booklet that can be slipped into a sales-book contains a review of the flannel board presentation and has spaces for personal comments. For the benefit of sales people, the kit contains a list of questions most often asked about the du Pont fibers, and the answers.

Information about fibers brought out in the training kit includes data on chemicals used in making Dacron polyester fiber, Orlon acrylic fiber, and nylon; their physical characteristics; their similarities and differences; their effect on finished garments; and how to care for these garments.

The circus motif is carried out in the presentation by cards carrying circus symbols well-known to most everyone. For example, the high bulking quality of Orlon is illustrated by a drawing of spun sugar candy; nylon's strength is represented by a side-show strong man; resistance to shrinking is shown by a long-necked giraffe.

How each card should be worked into the presentation is shown in the prepared script for the du Pont "fiber circus." The company recommends that during the program sample items of merchandise be passed through the audience to demonstrate hand, look, bulk, and other fabric qualities.

Cues for attaching the cards to the board are contained in the script. Each underlined word calls for placing a new card on the board.

The flannel board presentation was developed when the du Pont Company found it difficult to get across a retail training program on its fibers without some visual means of bringing simplicity and order to a bewildering array of properties, chemicals, and uses.

It was decided to follow the pattern set by the company's employee

Courtesy Visual Craft Supply Co.

Using a home-made flannel board to stress key points in a lesson.

relations department in its "HOBSO" (How Our Business System Operates) program, which uses a flannel board and hundreds of cards to present for discussion an intricate, detailed story convincingly in a relatively short time.

In addition to making the new "fiber circus" kit available to retailers, Textile Fibers Department retail training specialists are using the flannel board presentation in their programs at various stores throughout the country. In a typical program a du Pont retail training specialist will discuss man-made fibers with store executives as well as with personnel from the hosiery, glove, lingerie, sportswear, men's furnishings, house furnishings, children's and infants' wear, and dress departments.

How to Prepare a Flannel Board

The flannel board may be used effectively not only in business and industry, but also in the elementary grades and the secondary schools and on the college level. It may be used in all classes, including art, English, mathematics, social studies, science, language arts, business education, home economics, industrial arts, and vocational education. In many cases the flannel board could be prepared by the instructor and students in the classroom. It could be made a worth-while learning experience

in the classroom. Committees could be assigned the responsibility of actually writing the original script, building a flannel board, developing the cards to be use on the board, and presenting the completed job.

Flannel boards and materials used in making a complete flannel board presentation may be secured from a local audio-visual aid dealer, fabric departments, and stationery stores. Flannel boards, cotton flannel, Flok-tite backing, and other supplies may be secured by writing directly to the following sources:

L. A. Whitney Displays, 331 Madison Avenue, New York 17, N. Y.
Visual Crafts Supply Company, 640 North Willow Street, Kent, Ohio.
Florez Inc., 815 Bates Street, Detroit 26, Mich.

Ready-made flannel boards may be purchased from local dealers or from the above sources for approximately twenty dollars, perhaps more, depending on the size desired. However, home-made flannel boards are inexpensive and simple to make. The following suggestions will assist you and your class in preparing a flannel board:

1. Use ½-inch by ¾-inch plywood, wall board or heavy cardboard as the base.
2. Cut the base to the desired size. A 3 by 4-foot board should be used in the ordinary class room. Most lumber yards or hardware stores will cut the board to your size at the time of purchase.
3. Secure a piece of rough-napped cloth several inches larger than the board. Cotton flannel, flannelette, felt, suede, or any other material with a rough surface should be satisfactory. Test the cloth before attaching it to the board to make sure it will hold objects placed on it.
4. Stretch the cloth over the board, fold corners on the reverse side of the board and attach securely to the back of the board with carpet tacks or thumb tacks.
5. Plan to use board on an easel. If an easel is not available, hinge a piece of plywood to the back of the board in such a way that it will be possible to place the board on a desk or table.

The type of information used on the flannel board will depend on the nature of the lesson. However, you are limited only by your imagination. If preparing the flannel board is a class project, encourage your group to be creative. The following suggestions will assist you and your class in preparing the flannel board material.

1. Carefully plan to dramatize the key points in your presentation. The time allotted for the presentation and the size of the board should serve as a guide in determining the number and size of items you plan to use.
2. Magazine "cut-outs," line-drawings, symbols, figures, charts,

graphs, or other similar materials may be designed by you and your class. Make sure that printed material is clear and large enough to be seen by the entire group.

3. Use color to vitalize your material.

4. Place material on suitable pieces of showcard board. Cards that are too large become difficult to handle and store.

5. If possible, use showcard board with Flok-tite backing. If this is not readily available, you may cement small pieces of flannel, felt, or rough sandpaper to the back of the show card board.

6. Arrange to carry and store items used in the flannel board presentation in a shallow cardboard box in order to protect the cards from soiling and to prevent warping.

QUESTIONS

1. What are the advantages of flash cards?
2. What materials may be used for simple flash cards?
3. How may flash cards be lettered?
4. Briefly state how each type of lettering may be done.
5. What are several examples of flash card content?
6. How may flash cards be used for *Job Instructor Training?*
7. What would be the content of flash cards for *Human Relations Training?*
8. What are some of the outstanding features of a flannel board presentation?
9. What are some of the advantages of using a flannel board presentation?
10. What are some of the important factors to remember when preparing a flannel board presentation?

PROBLEMS AND PROJECTS

1. Prepare flash cards for "JIT." Come to class prepared to (a) demonstrate the use of these cards for training job instructors; (b) discuss and evaluate the materials prepared by others.
2. Prepare flash cards for "HRT." Come to class prepared to (a) demonstrate the use of these cards for training in human relations; (b) discuss and evaluate the materials prepared by others.
3. Prepare "strip flash cards" for a business or school instructional situation. Present your materials to the class, employing the technique described in the text.
4. List the "Do's for the use of flash cards."
5. Prepare a half-hour flannel board presentation dealing with a topic in which you are interested.

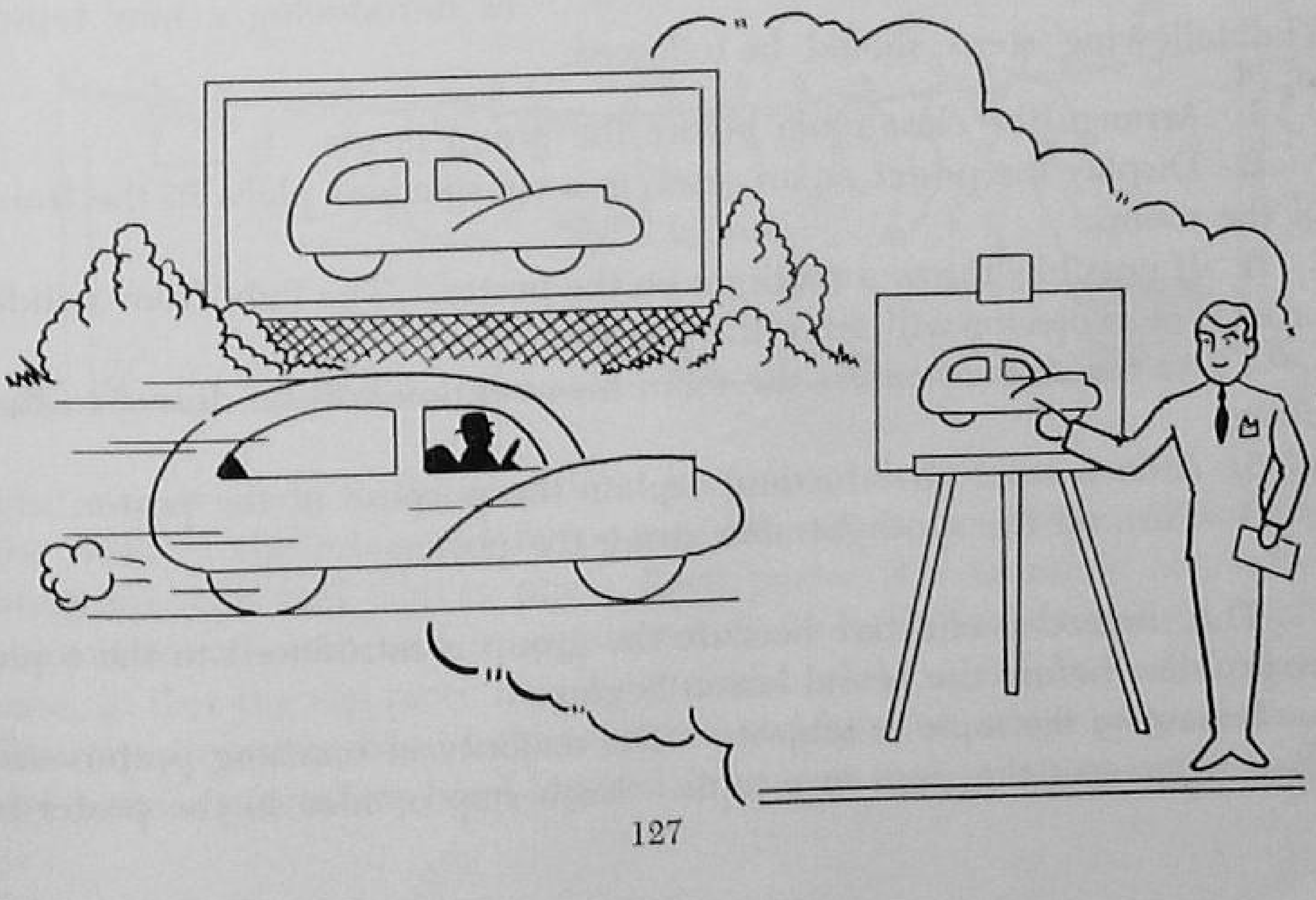
Courtesy of Wm. Filene's Sons Co.

Using "blow-ups" for clarification.

Posters and Manuals

The countless number of billboards spread across the country have only one purpose—to put across an idea in one fleeting glance. Posters accomplish the same purpose.

Large posters, such as billboards, could not be used conveniently in a class room, but smaller ones tell their story as vividly. An ideal poster size is 28 by 22 or 44 by 28 inches, depending on the size of the class

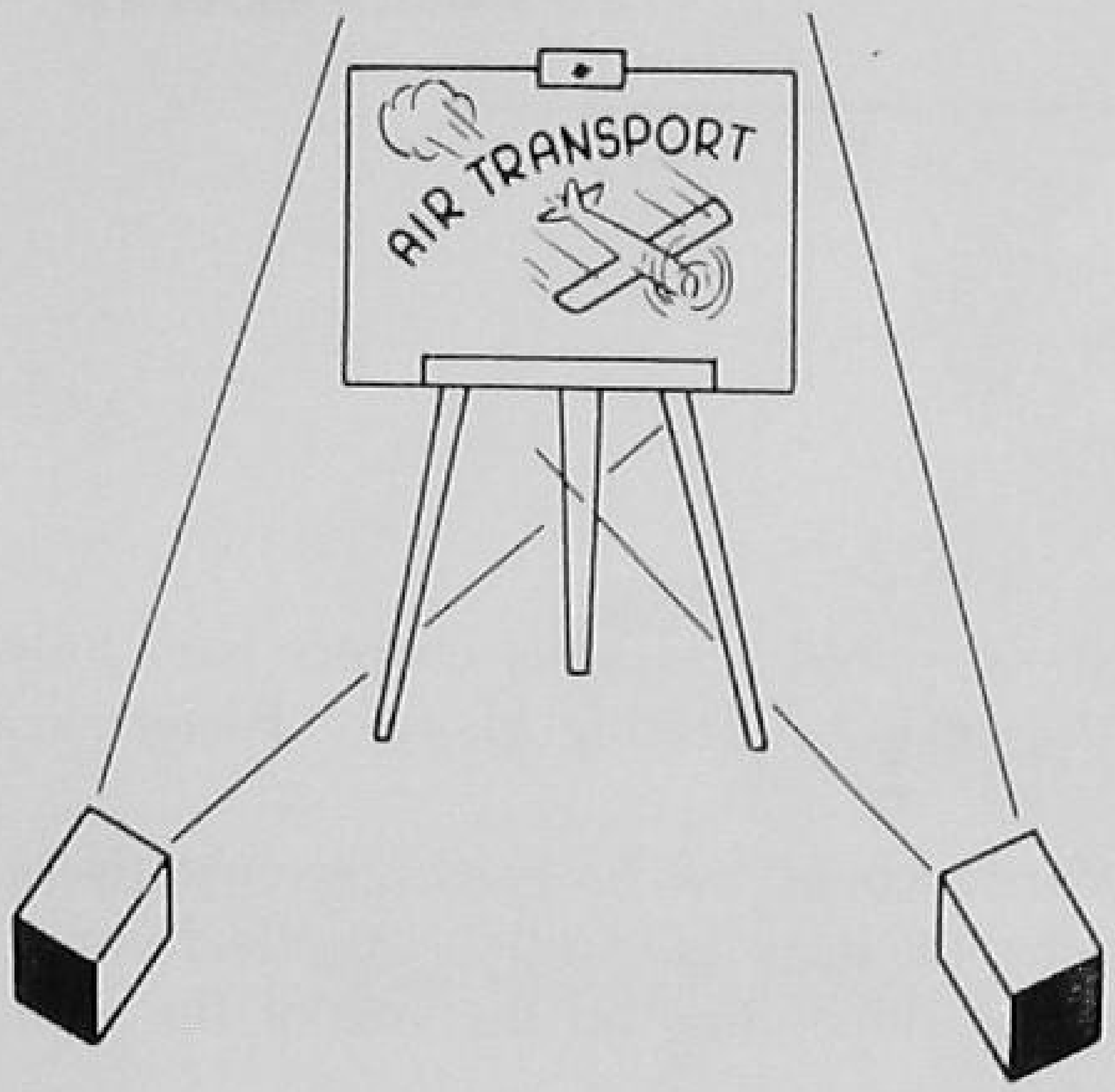


room. A poster may utilize charts graphs, diagrams, maps, pictures, cartoons—in short, anything that will help present the facts or emphasize a subject.

How to Use Posters

Check through your teaching plan and select the topics and subjects which could be presented more effectively by the use of a pertinent poster. Select or prepare the posters illustrating these problems. Remember that a good poster has one dominant idea, namely, to tell its story at a glance.

The poster may be used to (1) introduce, (2) present, and (3) review the topic or subject.



Regardless of when the poster is used, the following steps are essential: (1) prepare the student, (2) present the poster, (3) apply the information, (4) test the student, (5) review the subject or problem.

The time or methods required to carry out each step vary and will depend chiefly on the topic and the nature of the group of students.

Introducing the topic. The poster is an effective way of introducing a new topic. The following steps should be followed:

1. Arrange the class room before the group meets.
2. Display the poster on an easel, in a conspicuous place in the front of the room.
3. If possible, throw a spotlight on the poster. The light from a slide or opaque projector will serve the purpose.
4. As the student enters the room his attention will be drawn to the poster.
5. After a brief introduction, explain the purpose of the poster.
6. Turn off the spotlight after using the poster.

This method is effective because the group is introduced to the topic or problem before the actual lesson begins.

Presenting the topic or subjects. The majority of teaching posters are used to present the steps in a topic. Each step or idea in the poster is

carefully presented to the student in proper order. Tell and show each step. If possible, correlate the poster with other visual aids. Use the blackboard, photographs, slides, models, actual objects or any other teaching aid that will clarify the problem.

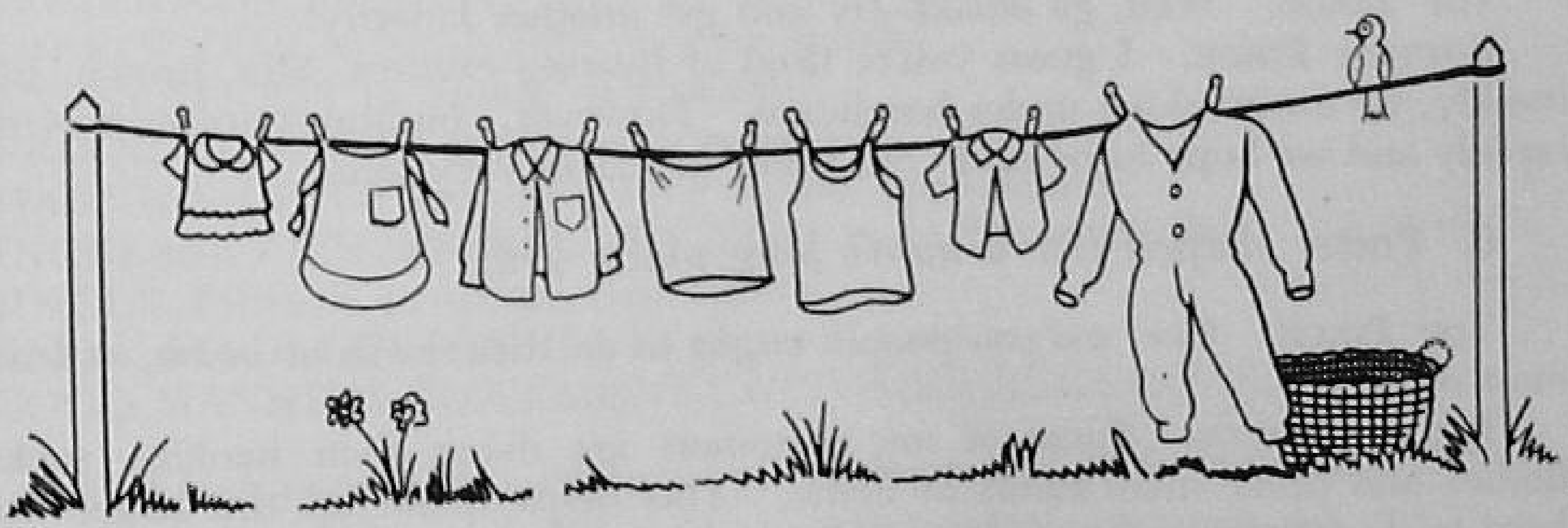
Reviewing the topic or subject. Before closing the class the subject or lesson should be reviewed by throwing the spotlight on the poster and briefly reading each step or idea to the students.

Another review method, especially adaptable to short unit programs, is to lay out a space on a bulletin board or a wall for posters based on each session. As each problem is completed, the poster is put in its proper place. At the completion of the program, the complete set of posters is reviewed.

Student-made posters. Excellent projects may be developed by encouraging students to prepare posters on specific problems in which they are interested. Allow them sufficient time to collect the material, and then permit them to present their posters to the group. For some novel and creative ideas, ask the student to prepare the title without writing or printing it with pencil, pen, paint, or crayon. For example, the title of a textile poster may be prepared by gluing or sewing the actual textile material to the poster to spell out the title.

Examples of Posters

An excellent example of the use of posters for instruction is the material used in the "Laundry Routeman" course, developed by the New Jersey State Department of Education. These posters are made up to resemble typical articles of apparel on a clothes line. A striking ap-



pearance is given to the classroom by a long clothes line pulled across the front of the room and by posters cut out in the shape of clothing hung up with real clothes pins. Each poster is a facsimile of clothes cut out of sail cloth, and is approximately 20 by 24 inches, and in duplicate, so that the top piece may be turned back to show the under piece. The top pieces are hand-lettered in red and blue on white sailcloth, and the bottom pieces are hand-lettered in orange and green on white sail-

cloth. The posters contain the following suggestions for laundry routemen:

1. *Poster shaped like a child's dress.*

TOP PIECE. N-o-o, missus—we don't want your business—we're jammed to the doors!

BOTTOM PIECE. N-o-o, madam, much as I would like to say "yes." We just *can't* accept new business now. Why not give me your name and address, and you'll be the *first* one I notify when we are able to add to our customers.

2. *Poster shaped like an apron.*

TOP PIECE. I wouldn't know when you'll get it back—or *how!*

BOTTOM PIECE. We really *are* short-handed these days, but you can be *sure* our folks are working hard to give *our* customers as *much* service as we can . . . and although I can't make a *definite* promise, we'll do our *best* to return it promptly.

3. *Poster shaped like a man's shirt.*

TOP PIECE. *Shirts* late? . . . You oughta be glad you *have* a shirt!

BOTTOM PIECE. I'm sorry, Mrs. Jones, but it seems that there's been *more* absenteeism than ever at the plant. So much sickness around right now. I'll have *your* husband's shirts back *just as soon* as possible.

4. *Poster shaped like a pillow case.*

TOP PIECE. I don't *own* the laundry—I only work there!

BOTTOM PIECE. We've had to eliminate the "frills" these days, but as soon as the new equipment arrives, we will be able to provide more service.

5. *Poster shaped like a man's undershirt.*

TOP PIECE. Well, *go ahead*—try and get another laundry!

BOTTOM PIECE. I guess you're tired of hearing excuses, Mrs. Brown, but frankly, we *are* working under handicaps. However, conditions are improving rapidly and we hope to be up to our usual standards very soon.

6. *Poster shaped like a man's long union suit.*

TOP PIECE. Gee, ma'am, people *ought* to do their wash *at home*, at least most of it!

BOTTOM PIECE. *Some* of my customers are doing their hankies, socks, doilies and other small items at home. This *helps* speed up the larger and hard-to-do articles at the plant.

Other aids. This excellent program also utilizes other visual aids, such as models, flash cards, photographs, cartoons, multiple poster book, a facsimile rule, and a wooden pie. A brief description of each of these aids follows.

1. *A facsimile rule*—72 inches long, divided into four articulating sections, each rule folding into length of one section. Painted yellow

with black space marks and the words COURTESY–COMPETENCE–COOPERATION–COORDINATION on each section respectively.

2. *Multiple posters* joined with a wooden stick at top–consisting of six posters 36 by 24 inches. It may easily be hung on an easel.

First poster. Two cartoons depicting general customer attitude to be taken by salespersons.

Second poster. Outline of routeman-customer relations course.

Third poster. Blown-up photographs showing "bad" and "good" examples of customer and routeman contacts.

Fourth poster. Routeman training.

Fifth poster. Blown-up photographs of routeman checking and writing up orders.

Sixth poster. BUILDING SALES BY SUGGESTING ADDITIONAL SERVICES.

3. *Cartoons.* A series of ten cartoons on flash cards, 15 by 22 inches, showing routemen with the following heads:

Mouse Head	Oyster Head
Wolf Head	Cat Head
Parrot Head	Mule Head
Dog Head	Pig Head
Monkey Head	*and* Ideal Routeman

4. *Illustrations.* Twelve illustrations of Techniques for Handling Customers. These posters are prepared in black and white and color on 15 by 20-inch cards. They are arranged alphabetically for "easy reading."

ASK QUESTIONS to win co-operation!
BE BRIEF to clear up troubles!
CONFIDENT BEARING . . . to control others!
DIRECTNESS to reach into people's minds!
EARNESTNESS to arouse enthusiasm!
FRIENDLINESS to overcome opposition!
HARNESS CRITICISM in a way to win appreciation!
INCREASE OTHERS' SELF-ESTEEM to cultivate loyalty!
JINGLE PRAISE to secure best efforts!
KNOW YOUR CUSTOMERS to generate harmony!
GOOD MANNERS TO CEMENT CUSTOMER RELATIONS!

5. *Flash cards.* Six cartoons on flash cards 14 by 14 inches, showing moods and reactions of different women customer types.

6. *Mounted board.* A large mounted board of cartoon series size 22 by 28 inches depicting notes left for a routeman entitled Notes to a Routeman.

7. *Model.* Model of house 24 inches high on platform 26 by 17 inches with: miniature truck 13 inches long and 7 inches high; routeman figure 7 inches high; three customer figures each 7 inches high; and bundle of laundry and dry cleaning–all in full colors.

8. *Pie for creating good will.* A wooden pie, measuring 28 inches in diameter, cut into ten sections. CREATING GOOD WILL is printed on the top, and when each section of pie is lifted, it reveals the technique for creating good will.

Sources of Posters

A large number of good posters for teaching may be secured from manufacturers, processors, libraries, museums, Chambers of Commerce, exhibitions, fairs, trade organizations, and government agencies. Most of these posters are distributed free of charge: a post card requesting the material is all that is necessary. Many of these sources will place you on their mailing list to receive new materials developed in the future.

Home-made posters. The best posters are home-made. Your own posters should have sufficient visual appeal to attract and hold the attention of the student long enough to put the facts across. Home-made posters should be:

1. Directly related to the specific topic. This is the chief reason for making your own posters.
2. Clear and forceful. There should be no doubt about the message the poster conveys.
3. Illustrated with pictures that tell the story. Titles and brief captions will help clarify meaning.
4. Well designed. The layout of the poster has a great deal to do with its effectiveness. It should center on one dominant job task. A forceful poster is plain, simple, and direct.
5. Colorful. Color attracts attention. When smartly used, it is one of the best methods of focusing attention on an important point. Use bold, vivid colors to obtain striking effects.

Size and material. The size of the poster will depend upon the size of the class room. Large posters 44 by 28 inches and small ones 28 by 22 inches will be adequate for most situations.

Ordinary wrapping paper, the backs of old posters, construction paper, and fiber boards will provide suitable background material. However, a sign card or show cardboard will prove to be most satisfactory. A thick sheet of cardboard, 44 by 28 inches, may be purchased for approximately twenty-five cents.

Titles and captions. Make titles attract attention and keep all captions brief. The title should be clearly visible to the entire group. If printing is used, the letters should be clear and approximately 2 inches high. Lengthy captions should be avoided. A good title is brief, but tells the story.

Contents. The originality of instructor and student will determine the contents of posters. Pictures, photographs, charts, graphs, maps, diagrams, lines, arrows, circles, and actual objects may be used. When models, specimens, or other objects are used, they may be attached to the poster with staples, scotch tape, needle and thread, or paste.

Comic books. Comic and cartoon books are rapidly becoming potent teaching devices, and should be utilized in your poster. A humorous story will arouse the interest of a student, and a good cartoon that emphasizes an important idea will have the same effect. Long after the subject is forgotten, the cartoon will be remembered. Cartoons are especially helpful in giving directions, calling attention to errors, and building morale. They appeal to the sense of humor, one of the most valuable assets of a student. Remember, you can catch more flies with honey than you can with vinegar.

Manuals

Briefly, a manual should contain all the possible information pertaining to a specific object, device, operation, or procedure. For example, a working knowledge of a store manual should enable a student-employee to (1) talk intelligently about his job or products, (2) answer customer questions concerning merchandise, (3) give suggestions on how to use and care for equipment and supplies, (4) display and sell products more effectively, and (5) give all-around better customer service. A student who has developed, or has complete understanding of, such a manual really becomes an expert in that specific field.

Sources of Manuals

Manufacturers and processors who realize that it is to their advantage to have intelligent representatives make, service, and sell their merchandise are preparing excellent manuals to accompany their products. The following is a partial list of other sources of manuals.

1. *Government Agencies:*

   United States Department of Agriculture.
   United States Department of Commerce.
   United States Department of Labor.
   United States Office of Education.
   Bureau of Mines.

2. *Universities:*
   - Research Bureau for Retail Training, University of Pittsburgh, Pittsburgh, Penn.
   - Extension Division, University of California, Berkeley, Calif.
   - Extension Service, Iowa State College, Ames, Iowa.
   - Bureau of Business Research, University of Illinois, Champaign, Ill.
   - Bureau of Business Research, College of the City of New York, N. Y.
   - Bureau of Business Research, Harvard University, Cambridge, Mass.
   - Bureau of Business Research, Ohio State College, Columbus, Ohio.

3. *Publishing Concerns:*
   - Butterick Publishing Company, New York, N. Y.
   - Chilton Company, Inc., Philadelphia, Penn.
   - Fairchild Publications, New York, N. Y.
   - Gill Publications, Boston, Mass.
   - Haire Publications, New York, N. Y.
   - Superior Printing and Lithographing Company, Akron, Ohio.

4. *Trade Assoications:*
   - National Retail Dry Goods Association, New York, N. Y.
   - National Livestock and Meat Board, Chicago, Ill.
   - National Dairy Council, Chicago, Ill.
   - Retail Shoe Salesmen's Institute, Boston, Mass.
   - Association of Fur Industry, New York, N. Y.
   - National Retail Hardware Association, Indianapolis, Ind.
   - American Toy Manufacturers' Association, New York, N. Y.

5. *Trade Journals:*
   - American Jeweler, Chicago, Ill.
   - Chain Store Age, New York, N. Y.
   - Dry Goods Economists, Philadelphia, Penn.
   - Men's Wear, New York, N. Y.
   - Millinery Trade Review, New York, N. Y.
   - Progressive Grocer, New York, N. Y.
   - Retail Home Furnishings, New York, N. Y.
   - Women's Wear Daily, New York, N. Y.

Home-made manuals. A "slick paper" professionally prepared manual is attractive and helpful, but it cannot be compared with the value of a student-made manual. The student prepares his manual on the phase of work in which he is especially interested at the time. The effort exerted in collecting information, organizing the material, illustrating, arranging and laying out the manual, preparing the cover, and the many other activities connected with the preparation of the manual, will give more meaning and value to the finished job.

How to make a student manual. Although the originality of the student should not be inhibited, certain basic information should be included in the manual. The following chapter headings will guide the preparation of a merchandise manual:

Chapter I:	Romance of Merchandise
Chapter II:	Raw Materials Used
Chapter III:	Manufacturing Processes
Chapter IV:	Types of Merchandise
Chapter V:	Colors of Merchandise

Chapter VI:	Sizes of Merchandise
Chapter VII:	Uses of Merchandise
Chapter VIII:	Stock Arrangement
Chapter IX:	Display and Advertising
Chapter X:	Care of Merchandise
Chapter XI:	Selling Points
Chapter XII:	Government Regulations

In addition to these twelve basic chapters, the manual should include: (1) an original cover, (2) a title page, (3) a preface, (4) a table of contents, (5) a brief objective test based on each chapter, and (6) a complete bibliography for future reference.

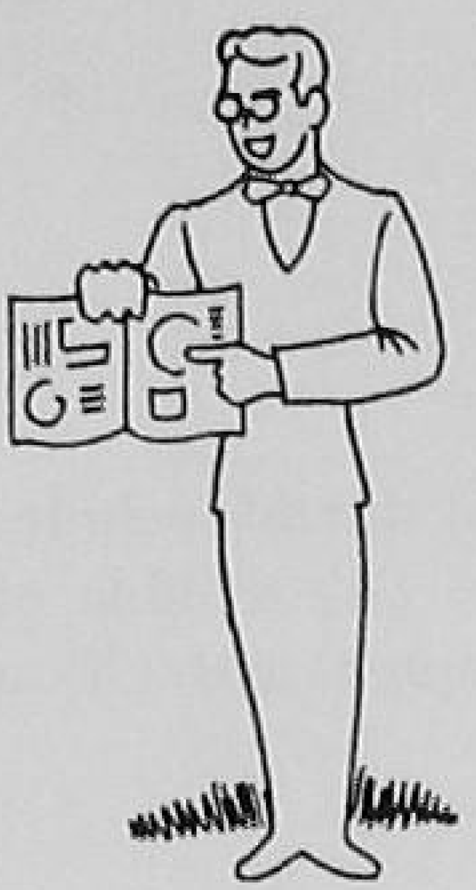
The following suggestions should also be followed:

1. The material should be arranged neatly and attractively.
2. A clear, hand-written copy is as effective as a typewritten copy.
3. Ink should be used instead of pencil.
4. Use one side of a sheet of paper and number each page.
5. Be liberal with the use of pictures and other drawings to illustrate specific points.
6. Sometimes it is advisable to include complete leaflets or booklets that are especially descriptive.
7. Specimens and other bulky objects should be attached securely with cellophane and scotch tape.
8. Develop a staple binding.
9. Include all correspondence with outside agencies.
10. Strive for originality in cover and manual layout. For example, a student manual in deodorants was made in the shape of a deodorant bottle. A manual on furs boasted a cover which consisted of a woman dressed in a real fur outfit made from scraps of fur picked up at a furrier's. With a little encouragement, a student will think of many similar twists for his own merchandise manual.

How to Use a Manual

Regardless of how attractive a manual appears, it is worthless unless it is studied and utilized. The exact procedure depends upon many variable factors, such as the type of commodity, the ability of the student, and the actual teaching situation. The time allotted for instruction would of necessity limit the time spent on the merchandise manual. However, whether the instruction is being given on the job or in the classroom, it should be presented in the following orderly procedure:

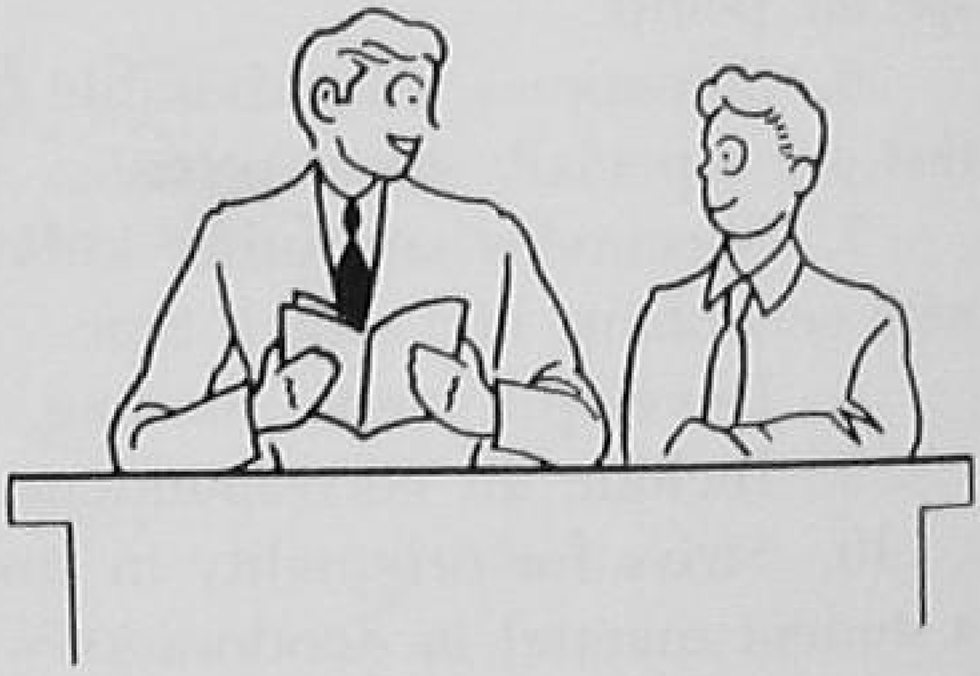
1. *Prepare student.* Thinking isn't rationed on the job, but before the student will exert effort, he must see how the information in the manual will help him. A brief review of the manual will show the student many of the important principles of good department management,



effective department layout, planned stock control, proportioned production, promotional ideas, best sellers, and other pertinent information. To the student, this will mean better department operation, greater and better production, increased earnings, and eventual promotion—all of which usually adds zest to a student's thinking.

2. *Present manual.* Even when time is at a premium, it is still worth while to go through the manual with the student page by page. Even the comparatively new student will grasp the more important points which you have emphasized. Do not expect the impossible. The student cannot swallow an entire manual in one gulp. Ask him to study the manual one section at a time, in easy doses.

3. *Apply manual information.* This is the most important step in the procedure. Each applicable suggestion in the manual should be applied to the student's specific situation. For best results, the information should be used immediately.



4. *Check student.* A good instructor will follow through by checking the student's application of instructions and suggestions contained in the manual. Misinterpretations and errors should be corrected immediately. In many cases, a student will lose interest if he does not think the instructor is interested enough in what he is doing to come back and check his work. On the other hand, the student might need more basic help on how to carry out some suggested idea.

5. *Follow up student.* This final step is overlooked by many teachers, but if its value were fully realized, it is doubtful whether follow-up activities would be neglected. The follow-up technique varies and depends upon the specific problem, but basically it consists of (1) observing, (2) rating, (3) retraining, and (4) commending the student. Any remaining errors are corrected and helpful suggestions are made. When a student does a good job, by all means commend him for it: praise will give him an emotional lift.

DO's for the Use of Posters and Manuals

DO illustrate problems with relevant posters and manuals.
DO make your poster tell its story at a glance.
DO use suitable manufacturers' posters and manuals.
DO encourage students to prepare their own posters and manuals to illustrate teaching projects.
DO require student to make a manual concerning the problem he is doing.
DO prepare the trainee before presenting the poster or manual.
DO use an easel to display poster.
DO display poster and manual so that they are easily seen.
DO explain each important item thoroughly.
DO use posters and manuals with other related teaching aids.
DO discuss or apply the poster or manual information as soon as possible.
DO test the student's knowledge of the poster or manual.
DO reshow the poster or manual to review the problem.
DO follow up the problem by exhibiting poster on the bulletin board.
DO permit individual student inspection of the manual.
DO catalogue and file posters and manuals in a suitable place.

QUESTIONS

1. What are the advantages of posters for instructional purposes?
2. What is the ideal size for a class room poster?
3. What is the basis for selecting posters?
4. For what may posters be used?
5. How should posters be used when introducing a topic?
6. How should posters be used to present a topic?
7. How should posters be used to review a topic?
8. What should be the content of a manual? Be specific.
9. What should a manual enable a student to do?
10. What are the advantages of home-made manuals?
11. What steps should be followed when using a manual for instructional purposes?
12. What are the things that should be included in a home-made manual?

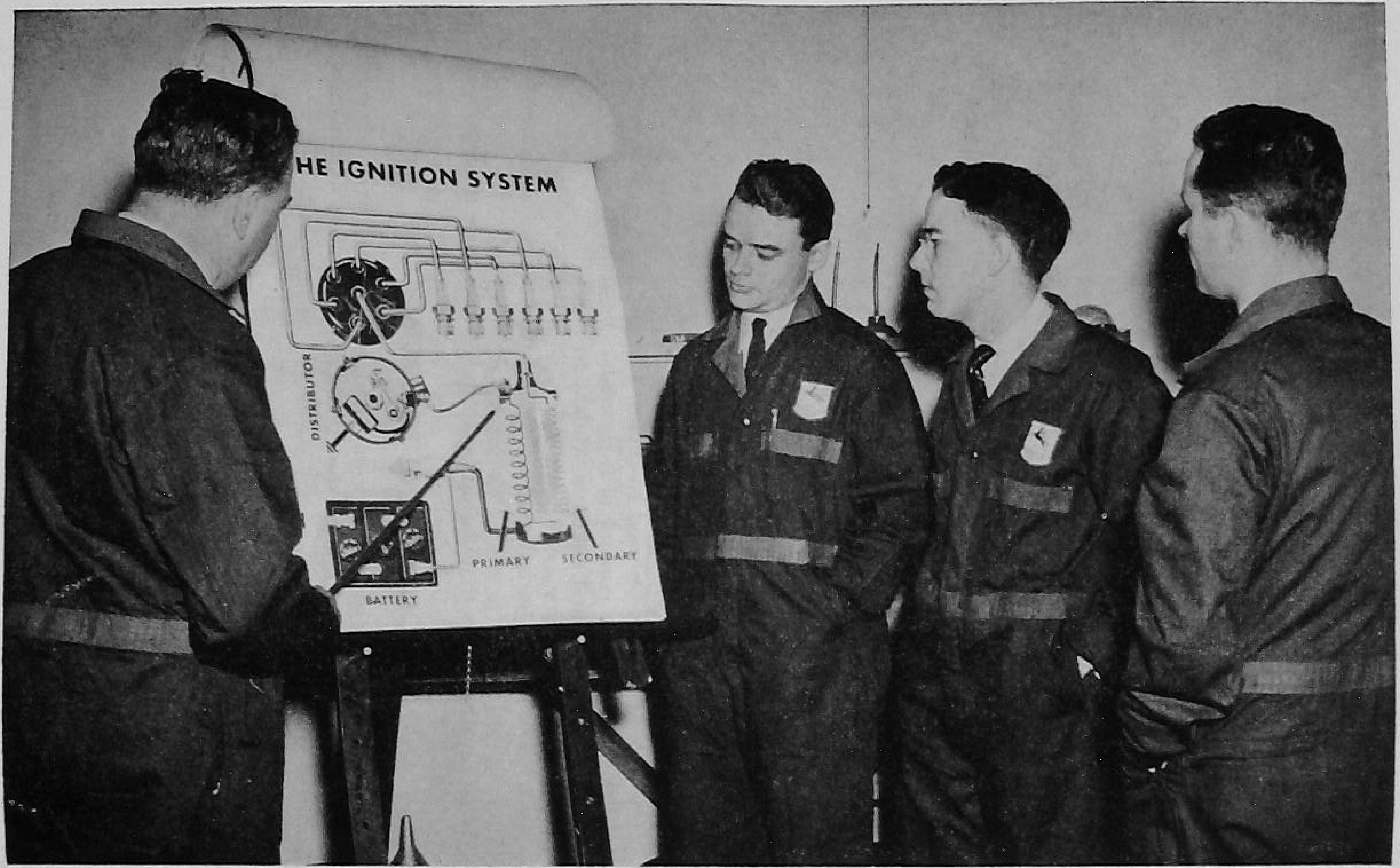
PROBLEMS AND PROJECTS

1. Bring samples of all kinds of posters and manuals to class. (See text for sources.) Be prepared to discuss the advantages of posters and manuals, and how to use them.

2. Prepare a manual, or a dummy copy, showing the seven parts of a manual mentioned in the text.

3. Prepare posters on any one topic. Come to class prepared to show how to use your posters in an instructional situation—following the directions in the textbook. The posters should be unusual or novel if possible.

4. List the "Do's for the use of manuals and posters."



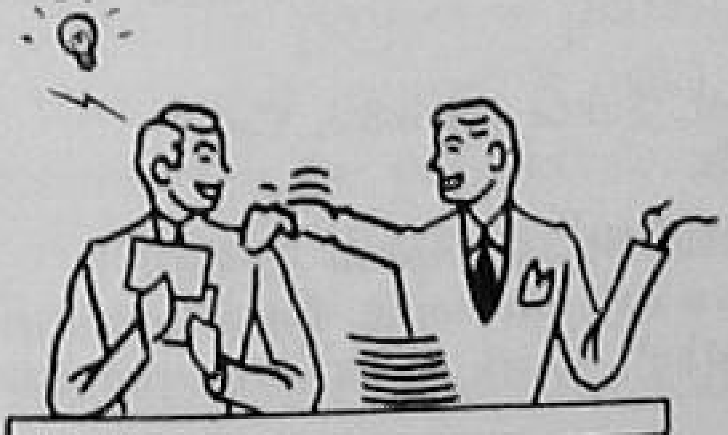
Courtesy of Socony-Vacuum Oil Co.

Simplifying complicated systems with drawings and diagrams.

Pictures and Photographs

Power of pictures. Without pictures the world today would not be as meaningful as it now is to most of us. Pictures crystallize ideas and form much of the basis for thinking. Successful, planned teaching depends upon the effective use of pertinent pictures. In teaching, pictures may be used to (1) arouse interest, (2) introduce new subjects, (3) illustrate specific steps in the problem, (4) build wholesome job attitudes, (5) develop appreciation, (6) test student's knowledge, and (7) review units of subject matter.

Each year industry and commerce spend millions of dollars for adver-



tisements in newspapers and magazines because pictures put their story across. Use of pictures in teaching will bring similar profitable returns.

The unlimited supply of good pictures, the ease with which they may be obtained, and their extreme economy make them one of the most valuable teaching aids.

Sources of Pictures

Pictures are where you find them: in the comic section of the Sunday paper or the cover page of *Esquire*. The countless number of advertisements, leaflets, brochures, and other booklets that you receive through the mail are all potential sources. It would be difficult to go through the popular magazines, such as the *Saturday Evening Post, Ladies' Home Journal, Good Housekeeping, McCall's, Red Book, American Magazine, Fortune*, and *National Geographic* without obtaining some good teaching pictures.

The fashion magazines, such as *Vogue, Harper's Bazaar*, and *Mademoiselle*, provide excellent illustrations, not only for style and design, but for many other related fields such as art, textiles, display, advertising, color, line, and design. In addition, there are magazines for all special fields of manufacture, commerce, and the professions.

The following are some of the leading commercial producers of flat-pictures:

Artext Prints, Inc., Westport, Conn.
Art reproductions—several hundred subjects.

British Information Services, 30 Rockefeller Plaza, New York 20, N.Y.
Sets of historic and current-interest pictures of the countries of Great Britain and the Commonwealth.

Hi Worth Pictures, 1499 E. Walnut Street, Pasadena 4, Cal.
Fifty-three curriculum units; also available as individual pictures.

Ideal School Supply Company, 8316 S. Birkhoff, Chicago, Ill.
Sets of 16 pictures of the cattle, fishery, glass, iron and steel, lumber, and rubber industries.

Informative Classroom Picture Publishers, 31 Ottawa Avenue, N.W. Grand Rapids 2, Mich.
Forty-one portfolios, each containing 16 to 48 pictures on a social-studies area—U.S. geography, U.S. history, geography of other lands, elementary social-studies units.

Instructor Picture Series, F. A. Owen Publishing Co., Dansville, N.Y.
Art, community helpers, symbols of democracy, symbols of freedom, symbols of liberty, and so on.

Latin American Village Studio, 3530 State Street, Santa Barbara, Cal.
Social studies, peoples of other lands, animals.

Marguerite Brown Study Prints, 700 W. Raymond St., Compton 3, Cal.
Social studies sets that contain 20 pictures to a set, on home, farm activities, farm animals, community helpers, post office, market, dairy farm, transportation, fire department, police department.

National Audubon Society, 1130 Fifth Avenue, New York 28, N.Y.
Nature study, birds, plants, insects, mammals, reptiles, amphibians.

National Geographic Society, 16th and M St. N.W., Washington, D.C.
Social studies—America, foreign lands—science.

Pat Dowling Pictures, 1056 S. Robertson Boulevard, Los Angeles, 35, Cal.
Social studies—early Western gold mining. Hawaiian Islands, ocean freighters, the pioneer fire room.

Perry Pictures Company, Box 4, Malden, Mass.
Art reproductions—statesmen, poets, historical events, scenery, architecture, sculpture, and so on.

Realistic Visual Aids, P.O. Box 11, Highland, Cal.
Social studies sets containing 15 photographs on community life, dairy farm, the farm, wholesale markets, transportation, post office, early American history, Mexico, South America, and the story of knighthood; sets with 30 photographs on "Across Early America"; sets with 8 pictures on "Early California."

Visualized Curriculum Series, Creative Educational Society, Inc., Mankato, Minn.
Social studies—including 703 pictures on food, clothing, shelter, transportation, communication, conservation of human resources, and conservation of natural resources.

How to Mount Pictures

Any picture worth using is worth mounting. Mounting a picture (1) protects it, (2) makes it more attractive, and (3) increases its effectiveness. Mounting is a simple operation, but a slipshod job detracts from the original value of the picture.

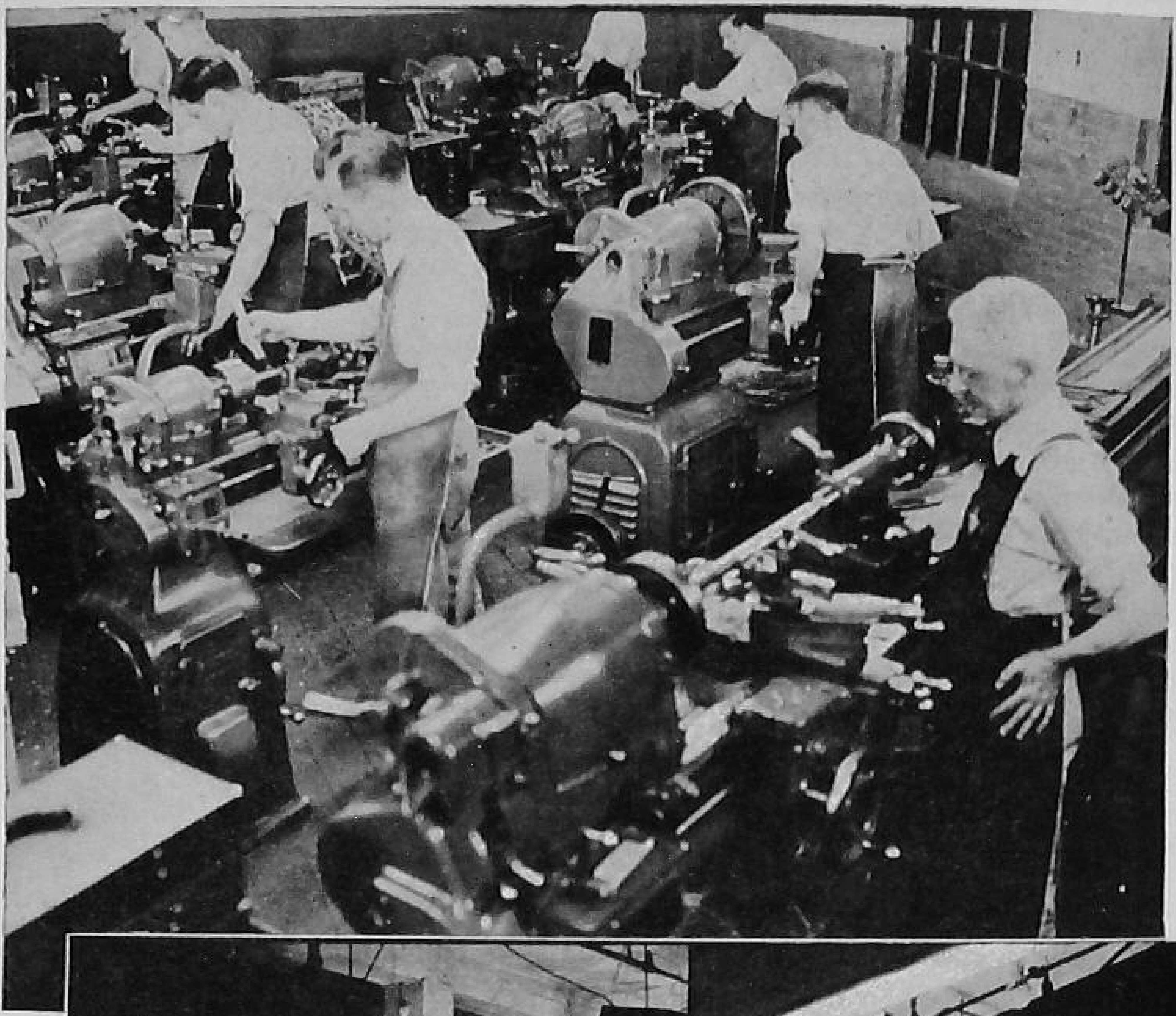
The following items should be carefully considered:

1. **Type of mounting.** In order to conserve space in the file, use a thin but durable cardboard. Illustration board, show cardboard, and construction paper make good mounts.

2. **Color.** A neutral color, such as tan or gray, may be used safely with most pictures. For a striking effect, select a color that blends with the predominant color in the picture.

3. **Size.** The majority of pictures and photographs available to the trainer will be 8 by 10 inches or less. In order to facilitate the filing system, use mounts in the following sizes: (1) 8½ by 11 inches for the large pictures, (2) 8 by 9 inches for the intermediate group, and (3) 3¼ by 5½ inches for the small pictures. This size range can be adequately handled by standard filing equipment. The 8 by 9 and 3¼ by 5½-inch mounts have been suggested for dual purposes: student inspection and for efficient use in most opaque projectors. The former may be used on the projector platen, and the latter in the post-card holder. When the larger mount is used in the projector, only 6 by 6¾ inches of the picture will be projected.

4. **Adhesive.** Paste, glue, rubber cement, or scotch tape may be used in attaching the picture to the mount. If paste or glue is used, cover the back of the picture and to avoid smearing place it on the mount



Courtesy of South Bend Lathe Works

Preparing training film on the job.

carefully. Press the mounted picture under some weights to prevent it from curling when the paste or glue dries. Weights need not be used with rubber cement because this cement will not curl the mount as it dries.

5. **Captions.** The perfect picture speaks for itself, but the majority of teaching pictures are much more effective when accompanied by brief, pertinent captions. If possible, place these descriptions on the front of the mount to avoid constant turning of the picture. A lengthy text, questions, or suggested projects may be placed on the back of the mount.

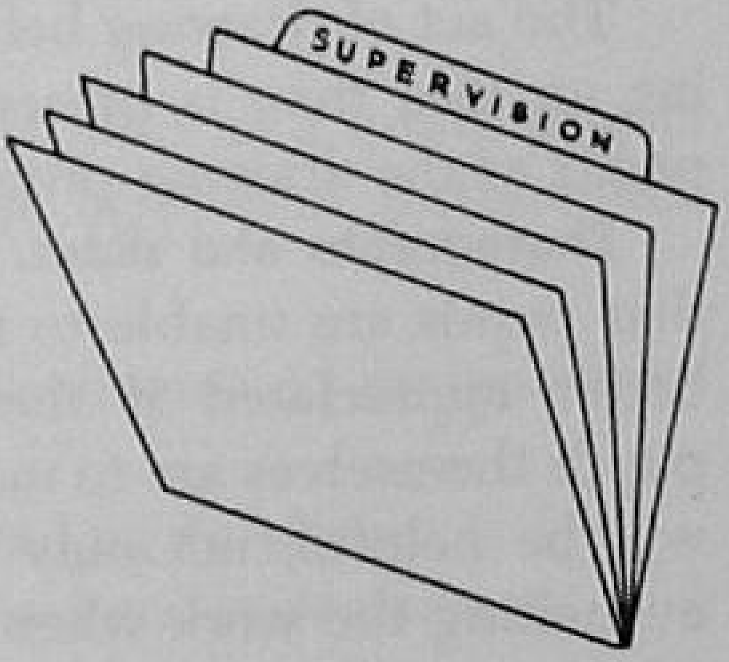
6. **Labeling pictures for filing.** A good filing system requires adequate labeling of each picture. Depending upon the "breakdown" of your filing system, place the unit or topic in the upper left- or right-hand corner of the mount. If an identifying number is used, place it in the opposite corner.

7. **Special effects.** Simplicity is the keynote for teaching pictures. However, occasionally dramatic effects may be obtained by "bleeding" a picture or by placing it flush in one of the corners. The artistic arrangement of several smaller congeneric pictures on one mount will also produce interesting effects. A series of that type should tell a complete story.

Pictures that are rare and require frequent use should be protected by a cellophane cover. Follow this simple procedure:

1. Cut a piece of cellophane ½ inch larger than the mount on each side.
2. Place mounted picture in the center of the piece of cellophane face down.
3. Fold edges of cellophane neatly.
4. Paste or glue edges on the back of the mount.

Filing Pictures and Photographs



Develop a "finger-tip" technique. A simple filing system will make it possible to locate the right picture at the right time.

Use the same topics developed for the opaque projector material file. If it is conveniently possible, use the same file for the opaque projector material, and for pictures or photographs. However, when the file is accessible to the student, it is desirable to keep the more confidential material, such as test sets for use in the opaque projector, in a separate file.

An active file requires constant care. When a file is used by a large group there is a tendency to (1) place material in wrong folders, (2)

spoil material by careless handling, and (3) forget to return material after using. Obviously these errors must be avoided. The importance of proper filing should be stressed with each student.

How to Use Art in the Preparation of Visual Aids [1]

It is difficult to conceive of any visual device without thinking in terms of its art qualities. To convey the full meaning of the great variety of illustrative material utilized in developing pupil understanding, an essential consideration is the development of appreciation of aesthetic values and relationships as exemplified in the study of art.

Since all visual aids are more or less abstract they need clarification either through drawings or through discussion. Therefore, the better equipped the teacher is to give a graphic interpretation to the problem, the more effective will be the teaching and learning experience.

Drawing as a visual aid. The first chapter of this book stated the value of pictures in making an idea clear. Every teacher knows that ability to draw is a great aid in making himself understood, for he can supplement verbal explanations tremendously with drawings. By drawing in this sense is not meant careful delineation of form, but rather the expression of ideas through symbols.

Drawing is of value not only to the teacher but to the business executive, salesman, scientist, and statistician in projecting ideas that would take hundreds of words to express. Many industries use it as a demonstration method to bring about broad and rapid dissemination of knowledge. Sales organizations see the advantage of drawing to give a more complete and graphic presentation of merchandise than is possible by words alone. Architects, designers, and engineers find solutions to many problems by making preliminary drawings.

The act of drawing before the class is often more effective in visualizing an idea than is presenting a finished illustration. The thought expands as the drawing progresses.

Photographs and slides. Useful in showing persons, places, or things that pupils are unable to see in reality. Photographs and slides can be better appreciated if their design principles are understood. If the pupils themselves are to make the photographs, the following art elements will be helpful, not only in learning the photographic process, but in evaluating the work when it is completed.

1. In selecting a subject, make the most of opportunities for employing design principles of harmony, balance, and rhythm. Even in a

[1] The following section has been contributed by Grace Martin Frame, head of the Art Department of Mason College of Music and Fine Arts, Charleston, West Virginia, who is an authority in teacher training and art education.

photograph of machine parts, design, and other qualities must be considered in order to achieve the most effective result.

2. Simplify subject matter as much as possible. In composing a picture, the photographer must know what to leave out. An overcrowded scene usually leads to confusion.

3. Aim for emphasis and subordination by size and placing.

4. Seek contrast of light and dark.

5. Try to put meaning into every line, form, and value.

6. Work for dramatic effect.

7. Strive for unity.

8. When posing figures or other models, make a quick pencil sketch to guide the composition.

9. In photographing landscapes, try for simple themes rather than panoramic effects. Informal treatment is best. Let the foreground emphasize or restate the theme, being careful not to introduce irrelevant materials.

10. Evaluate results and encourage critical judgment of each photograph and slide as to its observance of art principles.

Studying motion pictures. Show motion pictures to emphasize how the scenes are composed.

1. Study art qualities, principles of design (harmony, balance, rhythm), and elements of design (line, form, dark and light, and color).

2. Study application of principles and elements of design in lighting effects, settings, costumes, camera angles, and atmospheric treatments.

3. Study rhythmic organization of scenes and interrelationships of the sound and the visual image.

4. Test for art qualities throughout—how they contribute to the success of the film.

Art in making a motion picture. School-made films as a group project provide a valuable experience and may result in helpful instructional material.

1. Prepare for making a school film; choose theme and design scene, using art principles.

2. Develop story in rhythmic sequence leading to climax.

3. Secure services of art and dramatics teachers as consultants.

4. Design and build the sets.

5. Design and make costumes.

6. Have materials available—motion picture camera, 16 mm. film, lights, tripod, and lightmeter.

7. Photograph scenes, making pupils aware of fine design in relation to rectangular surface of screen.

8. Observe use of art elements in conveying an idea or mood.
9. Edit and arrange scenes in proper sequence.
10. Show film and encourage critical discussion.

School plays. Art principles can be of assistance throughout the planning and production of a school play.

1. The pupils should: Design setting for the story, depicting the scene in a painting.
2. Design miniature set for story.
3. Design costumes, settings, make sketches.
4. Draw plans for stage sets.
5. Construct the sets according to working drawings.
6. Correlate with speech by acting the parts, perhaps making a motion picture of the scene, using a 16 mm. motion picture camera.
7. Conduct critical discussion of results.

The museum as a visual aid. Museums fill a necessary role in visual education. Fortunate is the school that is within reach of a large museum. Since museums are essentially for education and are operated by experts and technicians, they are best suited to give the equality and variety of display needed.

Museum educational services supply visual materials at low rental cost. The Museum of Modern Art has circulating exhibits and educational services through which visual materials on the arts since 1870 may be procured.

Pupils will benefit by collecting and preparing materials for a school museum, even though the exhibits will of necessity be limited. Following are some points to keep in mind:

1. Make clear that the purpose of the school museum is to serve as a workshop for the pupil, as a visual instruction aid for the teacher, and as a center for all school subjects: art, music, dancing, history, science, geography, literature.
2. Show the benefit of the school museum to pupil, teacher, administrator, and community.
3. Organize staff for management of school museum, considering available space, construction, installation, collection and selection of nucleus exhibits, lectures, programs, and loan exhibits.
4. Use modern display and lighting techniques.
5. Give each piece or group of objects its proper seting.
6. Sustain interest and expansion of museum by frequent changes and additions.

Of the many aids to visual instruction, art is one of the most effective in promoting pupil understanding, for it not only gives meaning and pur-

pose to education, but provides for many of the principal factors in the educative process. Art and visual techniques are closely related and both are now functional parts of a broad educational program. Art provides some of the important functions of visual teaching by encouraging pupil participation; bringing about curriculum integration; developing a better understanding and appreciation of other visual aids, and giving opportunity for acquiring necessary skills.

Pupil participation. If the pupils have the advantage of an early start in art expression, such as that shown in the accompanying photograph,

A training laboratory in art. Three levels of learning are represented: a member of the teacher-training class, center, observes the work of high school and elementary pupils who are encouraged in self-expression and guided by teacher, left.

they will learn through doing how to manipulate and to use materials to express themselves graphically. Gradually they will gain a knowledge and feeling for art elements that are present in situations other than the art lesson itself. The National Scholastic annual art competition is a nationwide movement intended to increase art interest and ability in the schools. Some of the drawings and paintings shown in the background of the accompanying photograph were chosen by the Scholastic jury and exhibited at Carnegie Institute, Pittsburgh.

Early training in art brings better understanding of the function this subject plays in the preparation and use of visual aids. Participation in a process brings better understanding of the product than reading about it or observing some one else engaged in the activity. The teacher who

can encourage creative expression will obtain better results than one who makes all explanations verbally and dictates every step. Through participation, the pupil is led to experiment and to discover things for himself, under the expert guidance of a well-trained teacher. Of equal importance is the ability of the teacher to demonstrate materials and processes.

Curriculum integration. Through the use of art in visual teaching the entire curriculum can be integrated in an interesting way. English, science, history, geography, music, physical education, and other subjects have many elements in common with art and can be made more real to the pupil by an awareness of their relation to life through art. Abstract qualities such as rhythm, balance, movement, feeling, mood, time, space, design, and color, which all of the above subjects possess, can be more readily taught through art than by any other means.

Understanding and appreciation. Nearly every type of visual aid requires consideration of good arrangement, design, color, and form. These elements are made clear through art participation and demonstration. The pupil will be enabled to see more in a motion picture, if he is aware of the art elements necessary for the production of a successful film.

Development of skill. While skill is not of prime importance in art and should not, through too much emphasis, overshadow creative expression and appreciation, it can be acquired gradually through working with materials and processes, under expert guidance. Skill thus acquired can be of untold value in presenting and evaluating the visual instruction program.

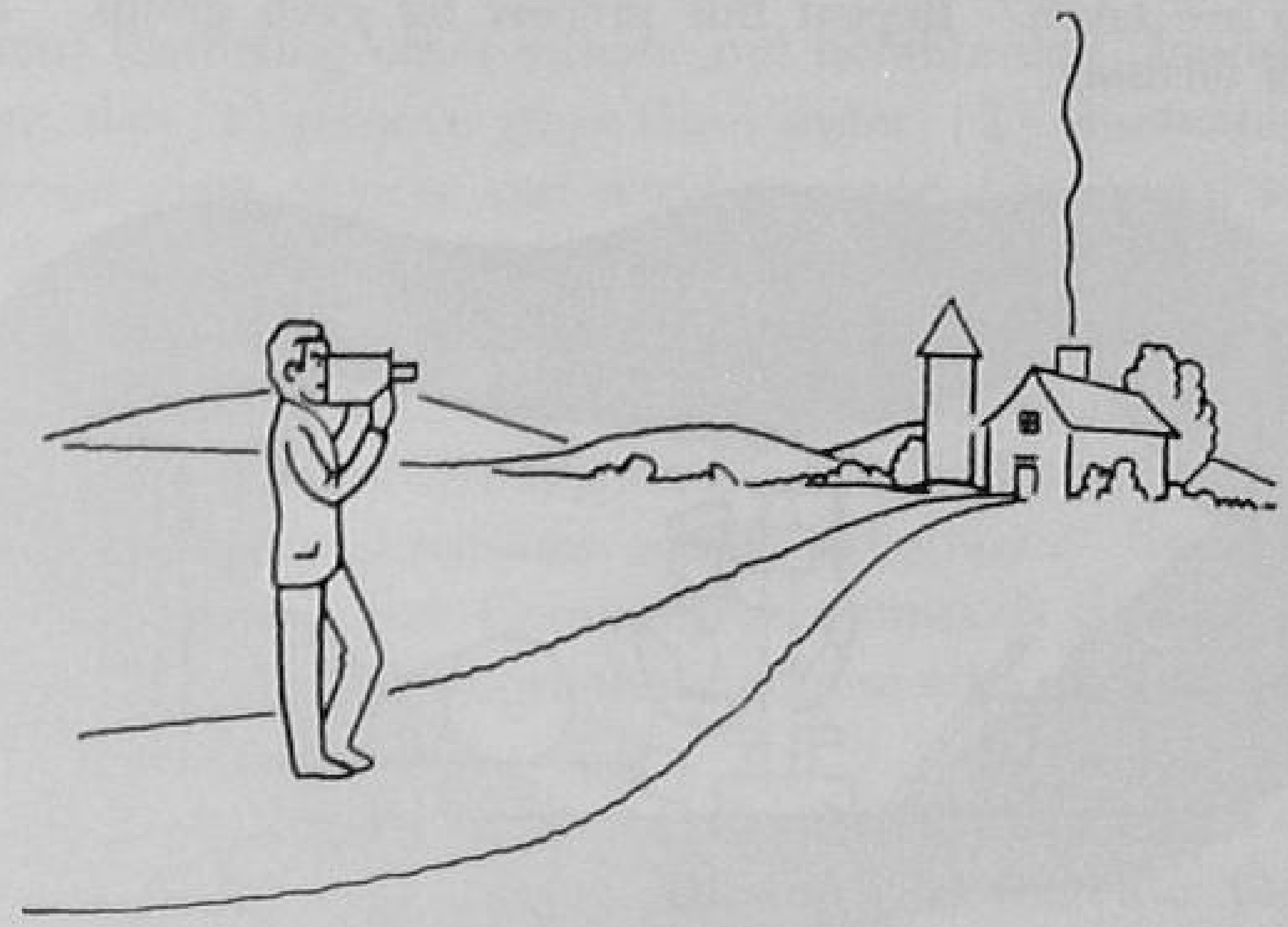
With a background of varied art experiences, of acquired knowledge and ability to appreciate, the individual is much better equipped to understand the various subjects of the curriculum and to look upon visual aids with a keener appreciation of their values. The purpose of art, then, in its relation to visual instruction is not merely to create interest, but to develop thought and reasoning, to stimulate imagination, to awaken a deeper appreciation and understanding of environment, to encourage descriptive responses, and to bring about permanence of learning.

How to Make Your Own Pictures

Variations in exposure conditions, cameras, and film prevent us from giving specific directions for making teaching pictures. However, satisfactory results will be obtained by carefully following the manufacturer's directions which accompany your camera and film. Correct exposure is assured when a light meter is used, but it is not absolutely necessary to have such a meter. Excellent pictures have been made with inexpensive box cameras.

Most indoor shots usually require special lighting, fast film, and a camera with a good lens, although it is possible to take an indoor "still

shot" with an inexpensive box camera by using a time exposure and resting the camera on a solid object to prevent it from moving. It is undesirable to include people or moving objects in a picture of this type.



The following helpful suggestions have been made by Dr. E. Dana Gibson.[2]

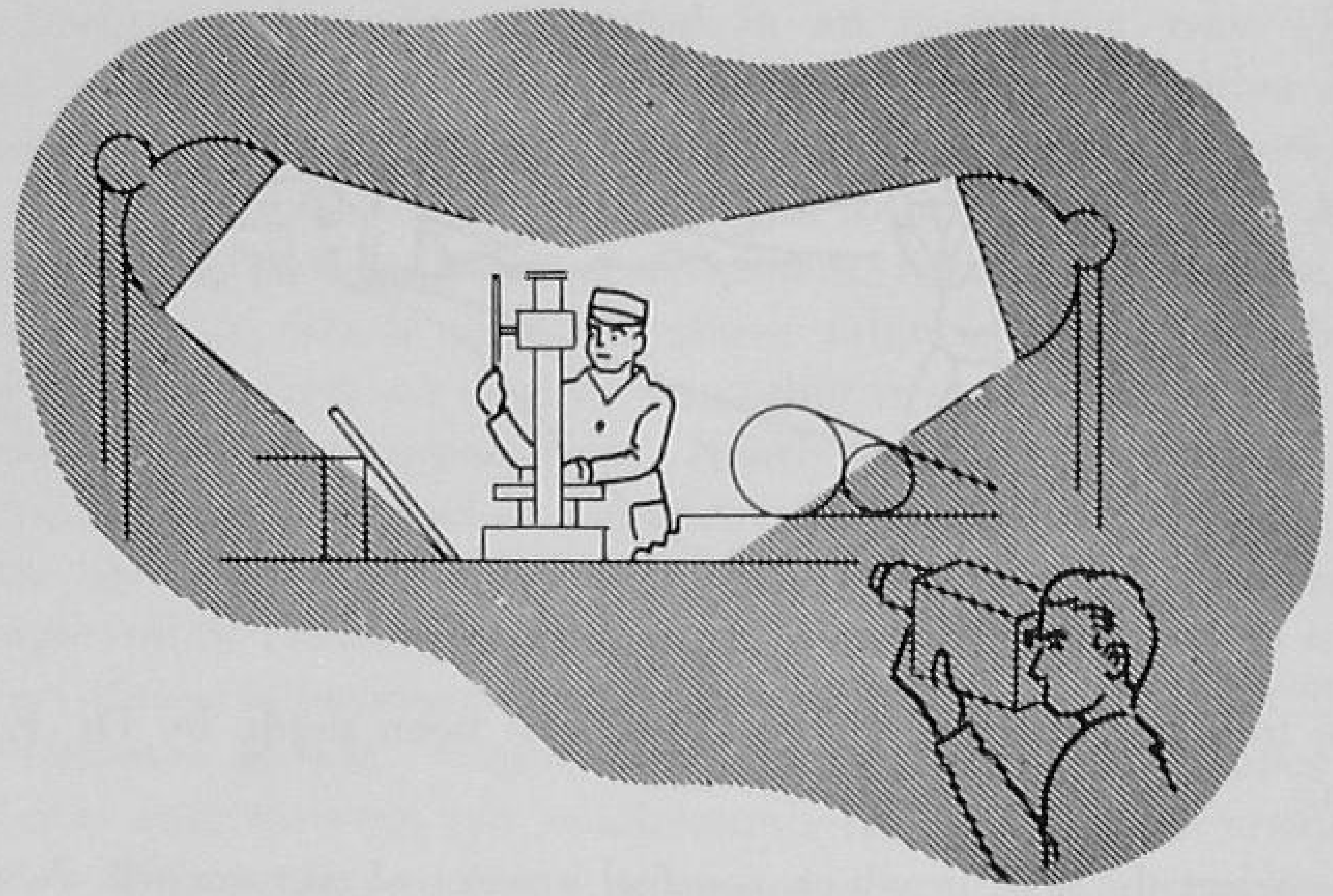
1. Select the area in which you feel a series of pictures will do you the most good.
2. Jot down the names of objects or situations that pictures will help you to explain to your class.
3. Discuss these with other business teachers, or check against texts, articles, or style books to see if you have forgotten teaching situations or objects that pictorial material would help illustrate.
4. Select mainly those items that offer the most contribution to the lesson. Limit your list to those pictures you can obtain easily.
5. Write out the explanation you want to place on the back of each picture. This will induce you to make further changes in the situations selected for "shooting" and help clarify your thinking as to their classroom value.
6. Divide your list of "shots" into two parts: one to contain all indoor pictures; and the other, outdoor scenes. This is necessary to avoid frequent changing from indoor to outdoor films.
7. Use 35 mm. indoor and outdoor Kodachrome film if possible—color adds interest to your pictures, and 35 mm. is an ideal size to use and a necessity if a filmstrip is to be made later of the pictures taken.

Now divide your indoor and outdoor lists into two groups—one to contain the distant shots and the other the close-ups. On the first group you will have little difficulty in getting the pictures wanted, but close-ups may require the help of the local phoographer or considerable experimenting on your part with the camera to get sharp negatives. A portrait, copy lens, or extension tubes may have to be purchased for close-ups.

The best way to take close-ups with the average camera is to sort all "shots" into groups having the same physical dimensions. Then obtain a piece of

[2] *Business Education World*, April, 1945.

fine ground glass the same width as your 35 mm. film, edge to edge, and about 1½ inches long. Open the back of the camera and place the ground side next to the lens. Focus on this glass, insert the film, and snap the picture. Slide in the next picture in the same group, and repeat the process until all pictures of that size are taken. Repeat this process for each group. This saves a great deal of focusing.



8. Before taking any pictures, study the situation or object to be taken and jot down notes as to the angle you think will be best from which to take it. Also, determine the distance necessary to obtain the picture, the exact setting (where is the object to be placed—if people are involved, what are they to be doing), and the shadow necessary in order to bring out needed contrast.

9. After the pictures have been developed, retake those not of good composition. Enlarge those that are satisfactory to 8 by 10 inches, a good classroom size.

10. Correlate the pictures selected with definite parts of your lessons. Unless you know exactly where they will fit best into the lesson plan, all previous work will have been more or less wasted.

11. To provide safe storage and easy use, set up a filing system for your pictures. This can be a letter file converted into a picture file. The picture should be placed in a folder like that used for letters.

Light filters. Light filters skillfully handled can be very helpful in preparing training photographs that are technically correct and of artistic merit. Light filters do exactly what their name implies: when attached to the lens holder on the camera, they keep out or absorb the undesirable light rays and permit the desirable ones to enter the camera, which enables you to secure the proper effects in your photograph. These filters are chiefly used (1) for correction purposes, (2) to develop contrast, (3) to overcome atmospheric haze, (4) to control sky brightness, and (5) for making tri-color-separation negatives. Neutral density filters are used

to reduce exposure when photographing bright subjects such as a welding operation or an open blast furnace.

"Polarized light." "Polarized light," such as made possible by the Kodak Pola-Screens or the Polaroid filters, not only produce dark sky effects without distorting other values and heightening cloud-to-sky contrast, but can also (1) remove glare from water, (2) eliminate disturbing reflections from glass objects and windows, and (3) reveal surface and subsurface details usually obscured by reflected glare-light.

Light filter suggestions. A large variety of light filters and kits, equally effective for both color and black-and-white photography, are available in most local photography departments. For best results, carefully follow the manufacturer's directions which accompany the specific light filters. The Eastman Kodak Company recommends the use of the filter chart on page 152 when photographing commercial subjects with type B panchromatic materials.[3]

Remember that all light filters absorb certain proportions of available light. Consequently, it is usually necessary to increase the exposure. Carefully check these factors before snapping the picture. Further information concerning the use of light filters may be obtained by referring to the Kodak data book, *Filters and Screens*, available at most photography stores for approximately 25 cents.

How to avoid common picture-making errors. The following tips will help you avoid many of the common picture-making errors:

1. Wind your film to the next frame as soon as you complete a picture. If you forget to advance the film, a double exposure results, and your pictures will be spoiled.
2. Hold your camera level for the best results. Tipping your camera upwards makes the object lean backwards. Take the picture from a greater distance to prevent tipping it upward.
3. Take time to sight the object carefully through the finder. Don't be a "headchopper."
4. Avoid tipping your camera sidewise, unless you are trying for an unusual shot. It makes the scene appear to be "downhill."
5. Select a simple background in preference to a complicated one. A poor background detracts from an otherwise good picture.
6. To prevent a blurred picture, hold your camera steady when snapping it.
7. A picture of a moving object requires a faster shutter to "stop" action. An ordinary camera may be used if the picture is taken at an angle from a distance.

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[3] Kodak Data Book, *Films and Pola-Screens*, Eastman Kodak Company, Rochester, New York, 1944.

FILTER RECOMMENDATIONS FOR COMMERCIAL SUBJECTS
(With Type B Panchromatic Material Unless Otherwise Specified)

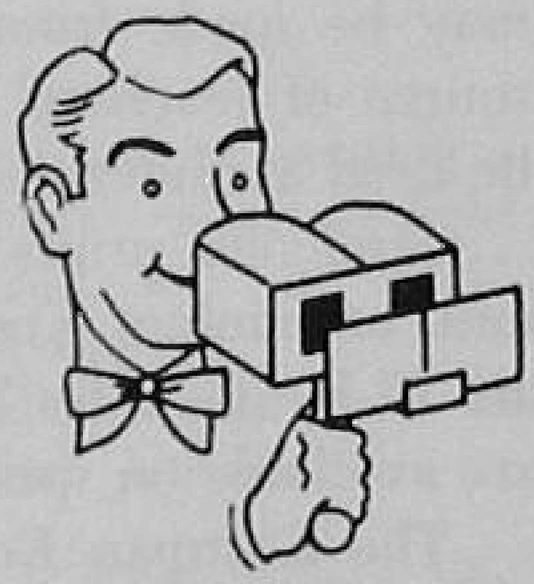
Subject	*Effect Desired*	*Suggested Filters*
Architecture: Light-colored buildings against blue sky	Separation between building and sky	K2
	Greater contrast between building and sky	G
	Dark sky	A
	Darker sky with any of above filters	Pola-Screen
Red brick buildings	Lightening of tone to show texture	G
Reflections from roofs and windows	To subdue	Pola-Screen
Automobiles: Dark colors	Lightening of tone to show shape and detail	Filter similar to color of car
Lettering on trucks, buses, etc.	Contrast to increase legibility	
Reflections from lacquered surfaces	To subdue	Pola-Screen
Colored China, Glass, Plastics, Pottery, Tile, Mosaics:	Natural rendering	K2 or X1
Reflections	To subdue	Pola-Screens at lens and lights
Fabrics, Clothing, Tapestries, Upholstered Furniture:	Natural rendering	K2 or X1
Dark colors	Lightening of tone to show texture	Filter similar to color of material
Furniture: Red woods, as mahogany and rosewood	Best rendering of wood grain	A
Yellow woods and others, as maple, walnut, oak, etc.	Best rendering of wood grain	G with Commercial Ortho Film
Wood furniture with other colors, as in a room setting	Best grain with good rendering of other colors	K2 or G
Leather, Linoleum, Wallpaper:	Natural rendering	K2 or XI
Colored leather with chromium	Lightening of leather so image of metal detail will print	Filter similar to color of leather
Reflections from linoleum	Subdue reflections which obscure pattern	Pola-Screen
Packaging: Colored boxes	To separate light reds from other colors	XI or K2
	Penetration of colored acetate sheeting to show material or detail within	Filter similar to color of sheeting
	To subdue reflections from Kodapak or other clear sheeting	Pola-Screen

8. Set your lens accurately for each shot, if your camera is equipped with a focusing device.

9. Before using your camera, wipe the lens carefully to remove dust or moisture. Use lens tissue or a soft cloth that will not scratch the lens.

10. Check finger position before snapping the picture. A finger protruding beyond the lens might spoil the picture.

Third-dimension pictures. Third-dimension effects may be obtained in a picture by the use of stereographs and the stereoscope. The stereograph is a card containing two pictures, usually photographed by a camera with twin lenses. The stereoscope is a simple device with two separated lenses and facilities for holding the stereograph in place. The learners look into the stereoscope, adjust the position of the stereograph until it is properly focused, and the result is a picture in third dimension. Third dimension provides a more realistic and vivid illustration of the subject. These pictures are made so realistic that a young learner in the lower grades thought he would fall off a cliff while examining a Rocky Mountain scene.



The stereograph and the stereoscope are especially adaptable for use in individual study, and they may readily be combined and used with other visual aids. The exact procedure will be determined by the specific problem.

Stereoscopes and a large variety of excellent stereographs may be purchased from the Keystone View Company. The stereographs include the following units of study:

- Art
- Biology
- Economics
- English and American Literature
- English Language
- Fine Arts
- Furniture
- General Science
- Geometry
- Geography
- Health and Hygiene
- History
- Maps
- Physics
- Reading
- Social Studies
- Safety
- Science
- Transportation

An instructor can prepare his own third-dimension pictures by the use of a camera such as the Stereo-Realist.[4] This is a 35-mm. camera, employing matched lenses and producing twin transparencies. Observed in a Stereo-Realist Viewer, the scenes are startlingly realistic. Third-dimension pictures may also be obtained by attaching the Stereo-Tach [5] unit to a 35-mm. camera such as the Argus, Contax, Exacta, East-

[4] David White Company, Milwaukee, Wisconsin.

[5] Available at most local photography stores.

man 35, Leica, or Perfex. When the finished transparencies are seen in the Stereo-Tach Viewer, the results are similar.

Home-made stereographs can also be prepared by photographing the subject with two cameras, placed alongside of each other, and using identical lenses. Write directly to your camera manufacturer or film company for information concerning the specific arrangement of the cameras.

Full-color prints. Striking, full-color pictures may be directly obtained by using color film in the roll or cut form. Excellent Minicolor prints may be made from Kodachrome transparencies. This is an excellent source of teaching pictures because the same transparencies may also be used as slides and in the preparation of stripfilm and slidefilm.

Minicolor prints are full-color enlargements prepared from either 35 mm. or bantam Kodachrome transparencies. The three standard sizes are 2¼ by 3¼, 5 by 7½, and 8 by 11 inches. However, larger size prints are available on special request.

The Eastman Kodak Company makes the following suggestions for judging your results with miniature Kodachrome film:

Dense, dark transparencies. These are characterized mainly by very dense and off-color shadows that are lacking in detail, and by absence of brilliant highlights.

CAUSE: Underexposure.

TO AVOID: Observe carefully the exposure instructions enclosed with the film.

Thin, light transparencies. Thin shadows showing detail but with "washed-out" highlights.

CAUSE: Overexposure.

TO AVOID: Observe the exposure instructions enclosed with the film.

Heavy, foggy shadows.

CAUSE: Failure to make allowance in exposure for side-or-back-lighting.

TO AVOID: Where possible, use front lighting with the sun behind the camera. Front lighting usually is preferable for color pictures as the color provides contrast. Consult exposure table included with film for taking side- or back-lighted subjects.

Blurred pictures (all over).

CAUSE: Camera was moved during the exposure.

TO AVOID: Hold the camera very steady, and hold your breath at the instant the exposure is made; or use a more rapid shutter speed and a correspondingly larger lens stop opening.

Blurred pictures (subject only).

CAUSE: Subject moved too rapidly for shutter speed used.

TO AVOID: When taking rapidly moving subjects, use fast shutter speeds and the correct lens stop opening.

Poor definition.

CAUSE: Focusing operation was neglected. If a supplementary lens is left on the camera and a distant subject is photographed, the picture will be out of focus.

To Avoid: Judge or measure the distances accurately and focus carefully; see instructions in the camera manual.

Picture misty.

Cause: Dirt or moisture on lens or filter.

To Avoid: Keep the lens and Kodachrome filter clean.

Clear areas. The film may show some color, usually reddish.

Cause: Clear areas at the beginning are caused by exposure of the film to too much light during loading, or by incorrect loading or unloading. Intermediate clear areas occur when the cover is removed from a camera containing a partially exposed film.

To Avoid: Use care in loading and unloading; see instructions in the camera manual.

Light streaks in pictures. Clear or colored flashes on the film.

Cause: Back of camera bent or not properly attached, preventing a light-tight fit; or some leak in case or bellows. A severe light leak may produce streaks throughout the roll.

To Avoid: Return camera to the manufacturer for repair.

Light circular spots or curved streaks. (A light cloudiness also may be present. These effects are commonly called "lens flare.")

Cause: Sun or lamp shining on lens.

To Avoid: Shield the lens so that direct light from the light source cannot reach it during the exposure.

Yellow pictures.

Cause: Yellow filter (for black-and-white pictures) accidentally left on camera. Too long a time elapsing between exposure and processing also may cause a yellow cast.

To Avoid: Never use a yellow filter with Kodachrome. Under conditions requiring a filter, use one that is specifically recommended for Kodachrome Film.

Return the film for processing as promptly as possible, and do not leave a partially exposed roll of film in the camera any longer than is absolutely necessary.

Excessive redness.

Cause: (1) Pictures were taken in early morning or late afternoon sunlight. (2) Daylight Kodachrome Film was exposed without Kodachrome Filter *for Photoflood* by regular Photoflood or Photoflash. (3) Daylight Kodachrome Film with Kodachrome Filter *for Photoflood* or Type A Film was exposed by ordinary Mazda illumination.

To Avoid: (1) Unless photographing the sunrise, sunset, or other special pictorial effects, do not take pictures just after sunrise or just before sunset. (2) Use the Kodachrome Filter *for Photoflood*, or Daylight Kodachrome Film with regular Photoflood or Photoflash illumination. (3) Do not use ordinary artificial illumination for either Daylight Kodachrome or Type A Film.

Excessive blueness.

Cause: (1) Kodachrome Film Type A used in daylight, or with Daylight "blue-bulb" Photofloods, without the Type A Kodachrome Filter for Daylight. (2) Type A Film used in artificial light with Kodachrome Filter *for Photoflood*.

To Avoid: (1) Use the Type A Kodachrome Filter for Daylight with Kodachrome Film Type A when subject is in daylight, or

under artificial light of daylight quality. (2) Use *no filter* and exclude all *daylight* when Type A Film is exposed by regular Photoflood or Photoflash Lamps.

Scratches, finger marks.

CAUSE: Scratches or abrasions are caused by rough handling, or small particles of dirt in the camera. Moist skin leaves marks on the lacquered surface of the transparency.

TO AVOID: Handle Kodachrome Film by the ends or edges. Clean with a soft brush. If this does not correct the trouble, return the camera to the manufacturer for servicing.
Finger marks can be removed from a lacquered transparency by gentle rubbing with Kodak Film Cleaner, applied with the pad included with the cleaner. Avoid scrubbing the transparency and use the cleaner quickly so that pools of liquid do not form on the lacquered surface.

Storage of processed film. Processed Kodachrome Film should be stored in a dark, dry, and cool place. The stored film should be kept away from radiators, steampipes, or locations where it may be subjected to high temperatures.

How to Use Pictures and Photographs

Beautiful pictures that are kept locked neatly in a file are worthless. On the other hand, a classroom that is cluttered with a multitude of heterogeneous pictures will only confuse and distract a student.

To obtain the best results, use the smallest number possible of pertinent illustrations. A picture is only valuable in teaching when it is effectively used to put across a specific point. Generally, the following steps should be observed, with the exact amount of time spent on each step dependent upon the nature of the picture, the student level, and the specific teaching situation:

1. *Prepare student.* The majority of pictures and photographs used in teaching will not arouse instantaneous interest. However, with a little effort, the instructor can put each student in a receptive mood. A picture becomes important when a student feels that it will benefit him. Interests may also be aroused by telling the student what to observe.

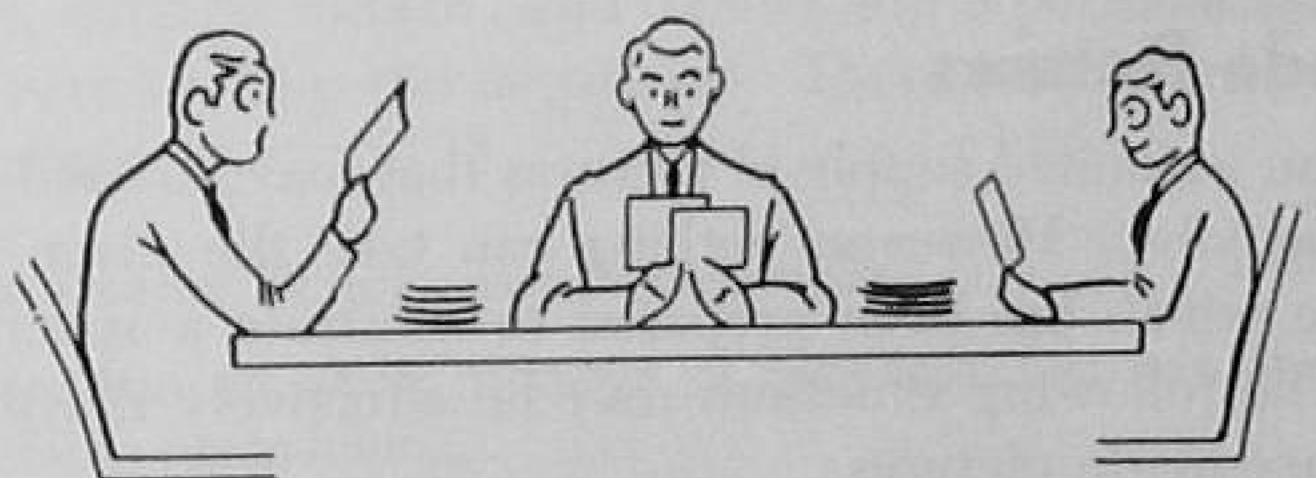
2. *Present pictures.* Very few pictures are self-explanatory: the vast majority require clarification as to size, color, distance, speed, movement, temperature, and smell. In order correctly to present a picture for proper understanding, each point must be indicated to the student in logical order. Place special emphasis on the more important facts.

Sufficient time must be allowed for this process. When a picture is presented to a group of students, at first each one sees something different, because the picture is interpreted in the light of his own experience. The instructor must allow for this first glance and then proceed to point out the important points in proper order.

3. *Apply information.* The student should be given an opportunity to apply the information obtained from the picture as soon as possible. If the problem deals with a manipulative skill, the instructor should insist upon correct timing and appropriate technical terms. Informational or attitude problems should be applied to a specific situation.

4. *Check student understanding.* The student performance, speed, and knowledge should be thoroughly checked by the instructor. All errors that are detected in a student's application should be corrected immediately. If complete retraining is necessary, do it immediately. Constructive criticism, tactfully given, is usually appreciated.

5. *Review.* Do not hesitate to reshow a picture, if you think it might clear up a discrepancy or correct an error. Many times another good look at a picture will clarify a complete job. However, specific errors which can be corrected by a picture should be carefully pointed out by the instructor. The student must be able to use the information or perform the task accurately. Remember, *if the student has not learned—the instructor has not taught.*



Other tips on using pictures. A large number of smaller pictures may be utilized by (1) individual inspection, (2) the bulletin board, and (3) the opaque projector.

Individual inspection. An 8 by 10-inch picture or a photograph may be presented from the head of a classroom table, or to a small group of students. However, a much larger picture must be used if it is to be presented to a large group from the front of the classroom. Permitting individual inspection of a picture will solve this problem.

Avoid routing the picture around the classroom while the instructor is talking, because this has a tendency to distract attention. Rather, secure a similar picture for each student, or divide the students into small groups of three or four and allow them to scrutinize each picture carefully.

Bulletin board. After presenting a teaching picture to the group, it may be further utilized by exhibiting it on the bulletin board. This will permit a follow-up activity on the part of the student who desires to re-examine a picture.

Occasionally interest may be aroused by displaying the teaching picture prior to the beginning of the lesson. However, this technique must be carefully handled in order to avoid cluttering the bulletin board and distracting the attention of the student.

Opaque projector. As has been pointed out in another chapter, the opaque projector is particularly adapted to the needs of the instructor, especially when it is necessary to present a small picture to a large group. Any picture may be projected on a screen, enlarged many times, for group observation. Refer to the chapter "Opaque Projector" for specific directions.

In some situations, it will be possible to utilize pictures by combining several methods of presentation. An initial presentation, using the opaque projector to enlarge the object (to facilitate group presentation), may be followed by the distribution of similar pictures for individual inspection. Then the picture may be exhibited on the bulletin board for future reference by the student. An ideal set-up would also provide an opportunity for the student to refer to the picture after it is placed in the file.

Home-Made Pictures

There is an unlimited supply of pictures that may be used to illustrate most teaching jobs. However, nothing can take the place of a home-made picture which has been prepared to illustrate a specific teaching situation. The following situations may be effectively illustrated by instructor-trainee-made pictures.

On-the-job activities. All students like to be photographed on the job. Not only does this give them an additional pride in their work, but it may also be used in remedial and corrective training. Pictures of students on the job are also excellent incentives for securing students in a cooperative work experience program.

Classroom projects. Projects that are developed in a classroom may be photographed for future reference. They arouse interest when exhibited in the library or on the bulletin board. Pictures of window displays and counter layouts arranged by students may be exhibited in a contest at the end of the year, with awards for outstanding jobs.

Store and plant projects and displays. A wide-awake store or plant manager will photograph outstanding promotions, special sales, layouts, window displays and other ideas that pulled traffic, increased production, or increased sales. A file of these pictures can be valuable for

future planning, since, in the following year, it will not be necessary to start from scratch. Merely "pull the file" for a proved idea.

Attractive pictures can be taken at night, or of interiors, with all lights on. Follow these directions:

1. Use a camera with a time-exposure setting.
2. Load camera with double-x panchromatic film.
3. Camera must be kept absolutely still. Place it on a tripod or any other steady support.
4. Open "time exposure."
5. Use one-, two-, or three-minute exposures. After the trial test, use the time exposure which gives the best picture.

Field trips. Photographs of a complete field trip are educational, interesting, and exciting, especially when the trip is being reviewed the following day. They present an opportunity for further investigation of important points observed during the trip, and they also serve to recall items that might have been overlooked. A file of this type of material will prove to be a wealth of source and reference information.

Progress and events. An interesting book, or manual, may be prepared by highlighting the outstanding events and activities of a class group. Both group and individual pictures, showing the student on the job and in the classroom, are extremely effective. Pictures of field trips, outstanding student jobs, prize winners, club officers, graduation scenes, group plays, outings, dinners, and dances add a personal touch to a class book. Be sure to keep the negatives. There will be many requests for duplicate prints.

DO's for the Use of Pictures and Photographs

DO utilize the countless number of excellent pictures and photographs available for teaching.
DO collect pictures from all available sources.
DO mount pictures on suitable backgrounds.
DO label each picture to facilitate filing.
DO protect scarce and frequently used pictures with a cellophane cover.
DO prepare your own photographs to illustrate specific teaching problems.
DO prepare the student before presenting the picture.
DO show only large pictures from the front of the classroom.
DO use a small picture for individual inspection or with the opaque projector.
DO use the opaque projector in presenting pictures to a large group.
DO combine techniques to exhibit a picture to its best advantage.
DO point out each important point in the picture.
DO discuss or apply the information in the picture as soon as possible.
DO test the student's understanding of the picture.
DO review the problem by reshowing all pertinent pictures.
DO use pictures with other related teaching aids.
DO follow up the problem by displaying pictures on the bulletin board.

DO photograph field trips to facilitate follow-up study.
DO photograph student progress and special events.
DO use home-made pictures for publicity work.
DO catalogue and file all pictures and photographs for easy reference by student and instructor.

QUESTIONS

1. For what purposes may pictures be used?
2. What are the chief sources for pictures?
3. What items should be considered when mounting pictures?
4. How should pictures be filed?
5. What are the advantages of making your own pictures?
6. What are the suggestions made in the text for avoiding errors?
7. How may third dimensions effects be secured in pictures?
8. Where may stereographs be obtained?
9. What steps should be employed in using pictures for instructional purposes?
10. What subjects may be considered for home-made pictures?

PROBLEMS AND PROJECTS

1. Collect and bring to class pictures and photographs. Sources for these materials are: business and school files and magazines such as *Vogue*, *Esquire*, *Fortune*, *Saturday Evening Post*. Home, factory, and store pictures may be especially valuable. Be prepared to tell how to use these materials in an instructional situation.

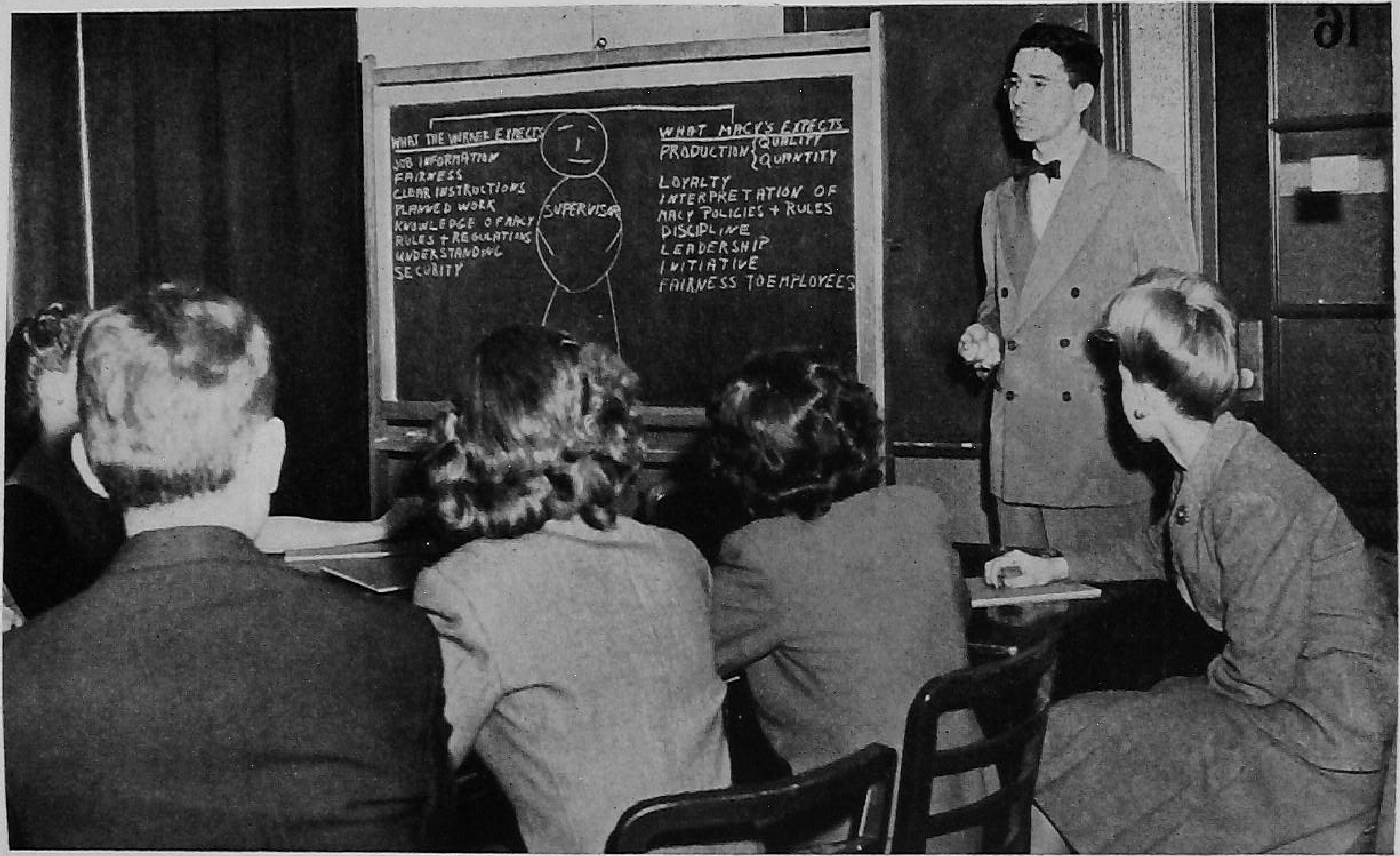
2. Prepare slides, films, and opaque materials from pictures and photos—as indicated by your instructor.

3. Be prepared to discuss and evaluate the contributions of other students. Emphasize "how," "why," "where," and "when" they would use these materials in instructional situations.

4. Be prepared to demonstrate how to mount pictures and photos.

5. Be prepared to demonstrate how to use cellophane as a protective cover for pictures and photographs.

6. List the "Do's for the use of pictures and photographs."



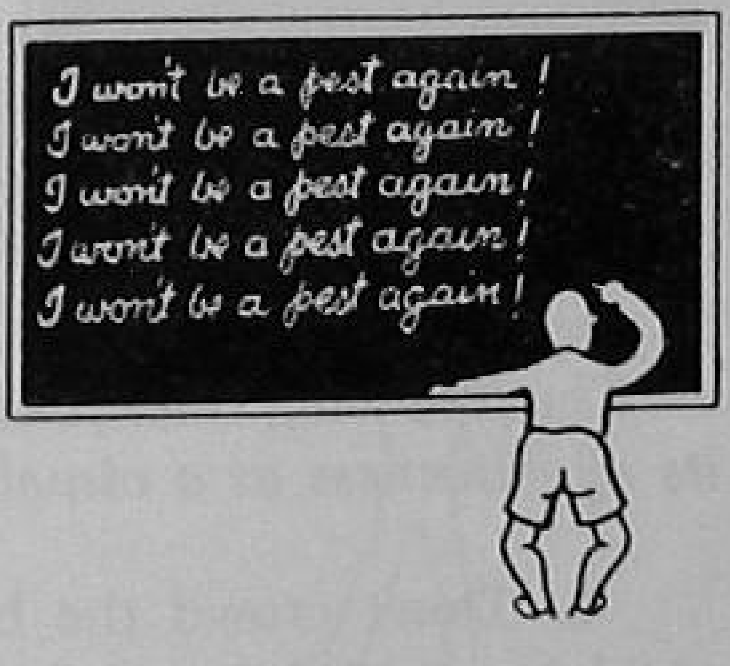
Courtesy of R. H. Macy & Co.

Using the blackboard in a supervisory training conference.

The Blackboard and Bulletin Board

The blackboard. The blackboard is probably the most widely used visual aid. Properly used it may be of tremendous value in all kinds of teaching. You will find the blackboard a convenient and effective visual aid, one that permits contrast, implies action, and helps the student in his note-taking.

You can get contrast on the blackboard by using heavy and light chalk strokes. Chalk of various colors, such as green or yellow, helps you in your teaching, and helps the student grasp the subject matter. Neatness and orderly arrangement of your blackboard material contribute to effective contrast.



Convenience is another advantage of the blackboard as a visual aid. You can use the blackboard to list items, the important points of your lesson, or to draw charts or illustrations for the class. You can solve problems on the blackboard. It is an excellent supplement to other teaching aids.

The fact that you are moving about, are active, while you use the blackboard, keeps up the interest of the class. They watch your movements. They remember what you do.

The blackboard as a visual aid helps note-taking. If it is important that the class grasp technical names, addresses, or a brief list of points

to be covered, you will insure accuracy by writing the information on the blackboard and having the class copy what they need.

As a "point clincher" the blackboard is unequaled. The important points of a subject or problem may be driven home with a piece of chalk and a blackboard. You have two opportunities of putting your story across when you present it verbally and then place the key points on a blackboard.

The following list of items, for which a blackboard may be used, indicates the versatility and effectiveness of this visual device.

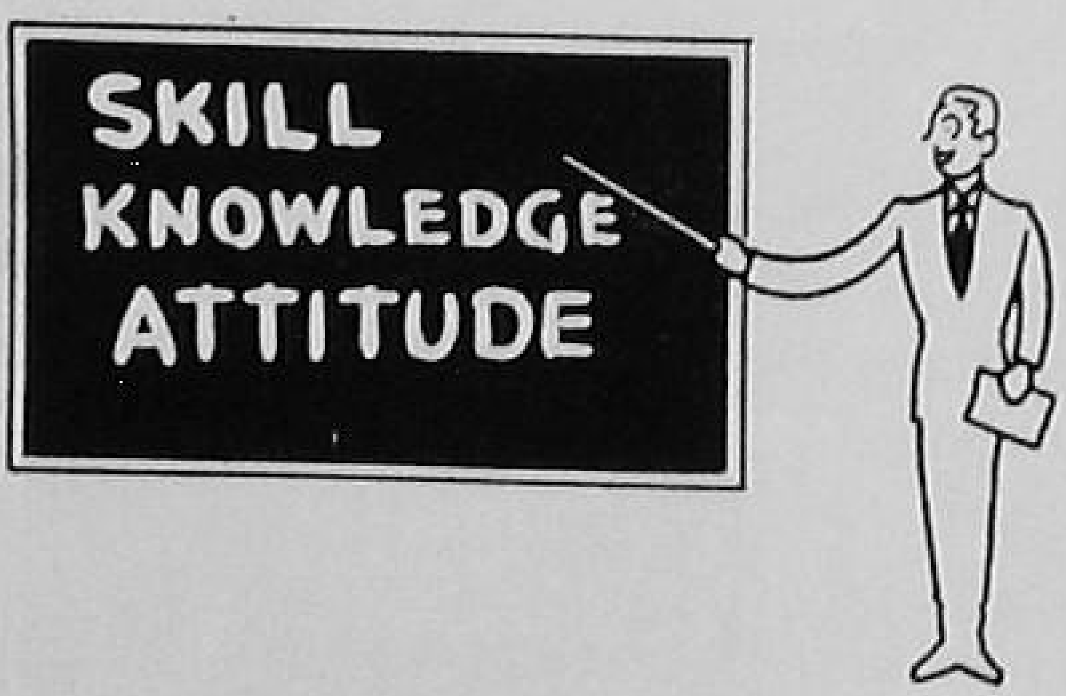
BLACKBOARD POINT CLINCHERS

Drawings
Sketches
Maps
Graphs
Diagrams
Technical words
Definitions
Key words
Outlines
Reviews

Daily problems
Assigning new problems
Problems to be solved
Making announcements
Company rules and policies
Giving directions
Illustrating procedures
Testing
Training records
Tracing screen

How to Use the Blackboard

Blackboard work should be simple and brief. Copying lengthy outlines or lists of subject matter is a waste of time to instructor and student. If it is important for the student to have a copy of this material, it should be duplicated and distributed.



The blackboard is similar to a store window. Everyone knows that an overcrowded, dirty, and untidy window display has little stopping value as compared to one that is clean and neat and displays a few well-chosen items.

The following rules for using the blackboard should definitely increase its effectiveness as a visual aid:

1. Don't crowd the blackboard. A few important points make a vivid impression.
2. Make the material simple. Brief, concise statements are more effective than lengthy ones.
3. Plan blackboards ahead. Keep the layouts in your teaching plan folder.

4. Get together everything you need for the blackboard before the class meets—chalk, ruler, eraser, and other items.

5. Check lighting. Avoid blackboard glare. Sometimes it will be necessary to lower a shade and turn on the room light.

6. Use color for emphasis. Chrome yellow and pale green chalk are more effective than white chalk.

7. Print all captions and drawings on a large scale. The material must be clearly visible to each student.

8. Erase all unrelated material. Other work on the blackboard distracts attention. Use a board eraser or cloth, and not your fingers.

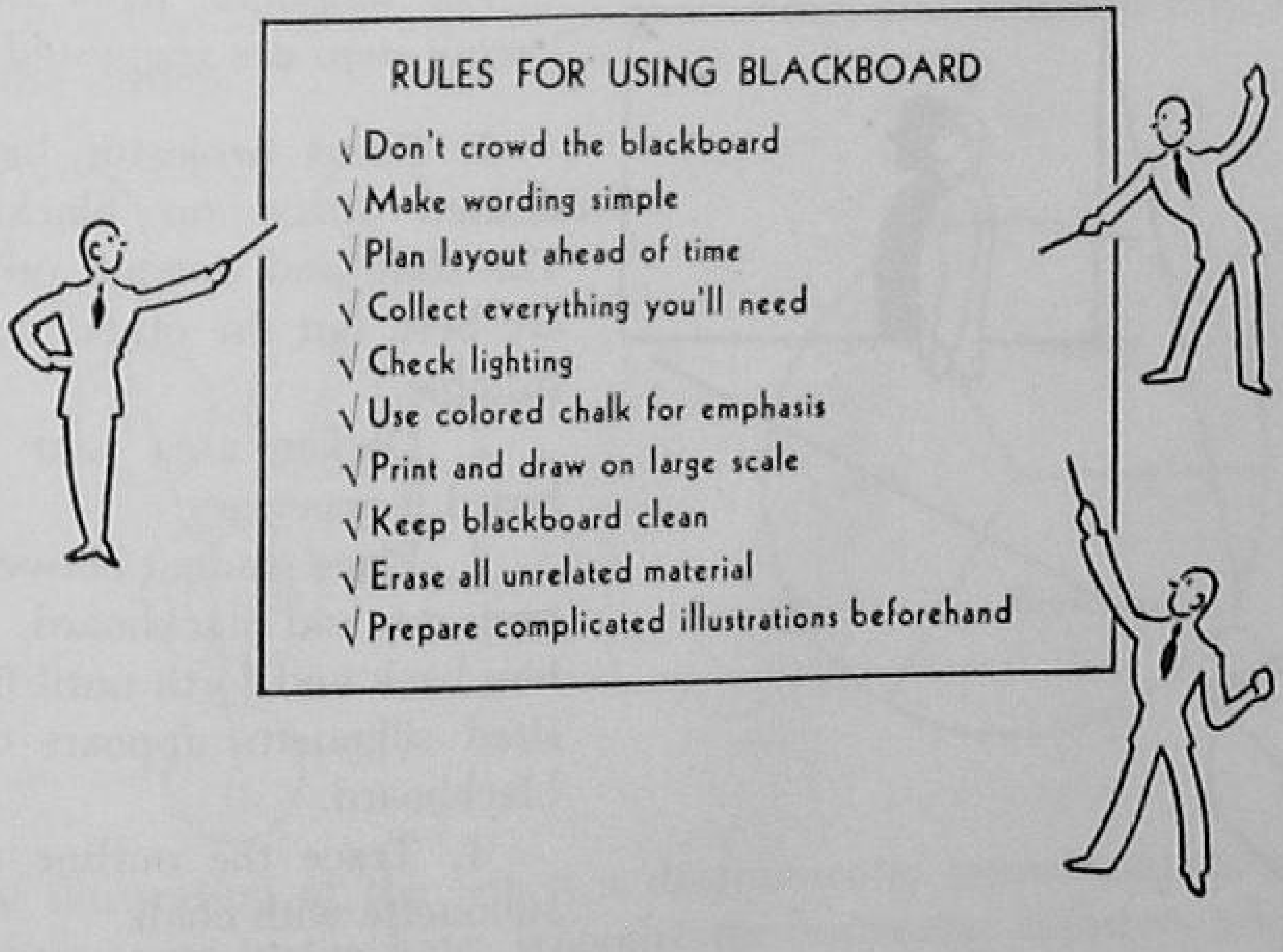
9. Keep the blackboard clean. A dirty blackboard has the same effect as a dirty window.

10. Prepare complicated blackboard layouts before the group meets.

Presenting Blackboard Material

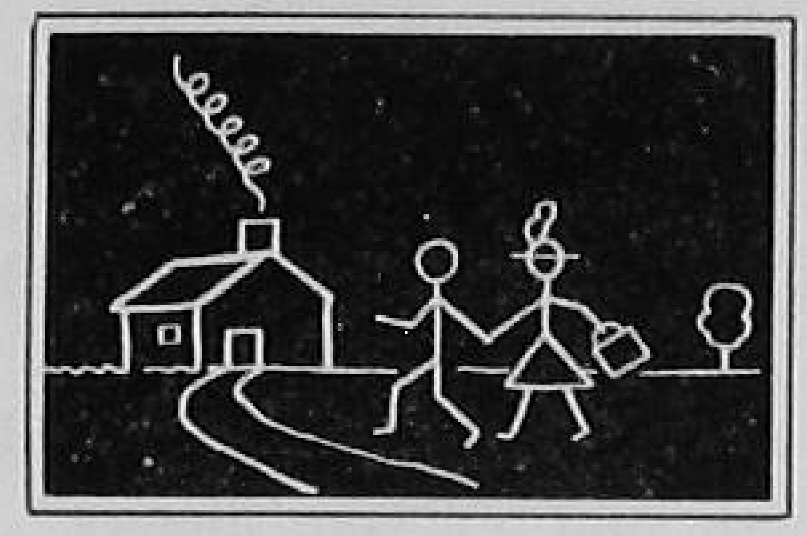
Accent the positive. During the presentation of the subject, accent the positive at the right moment. Place the material on the blackboard to clinch the idea when it will do the most good. For more emphasis:

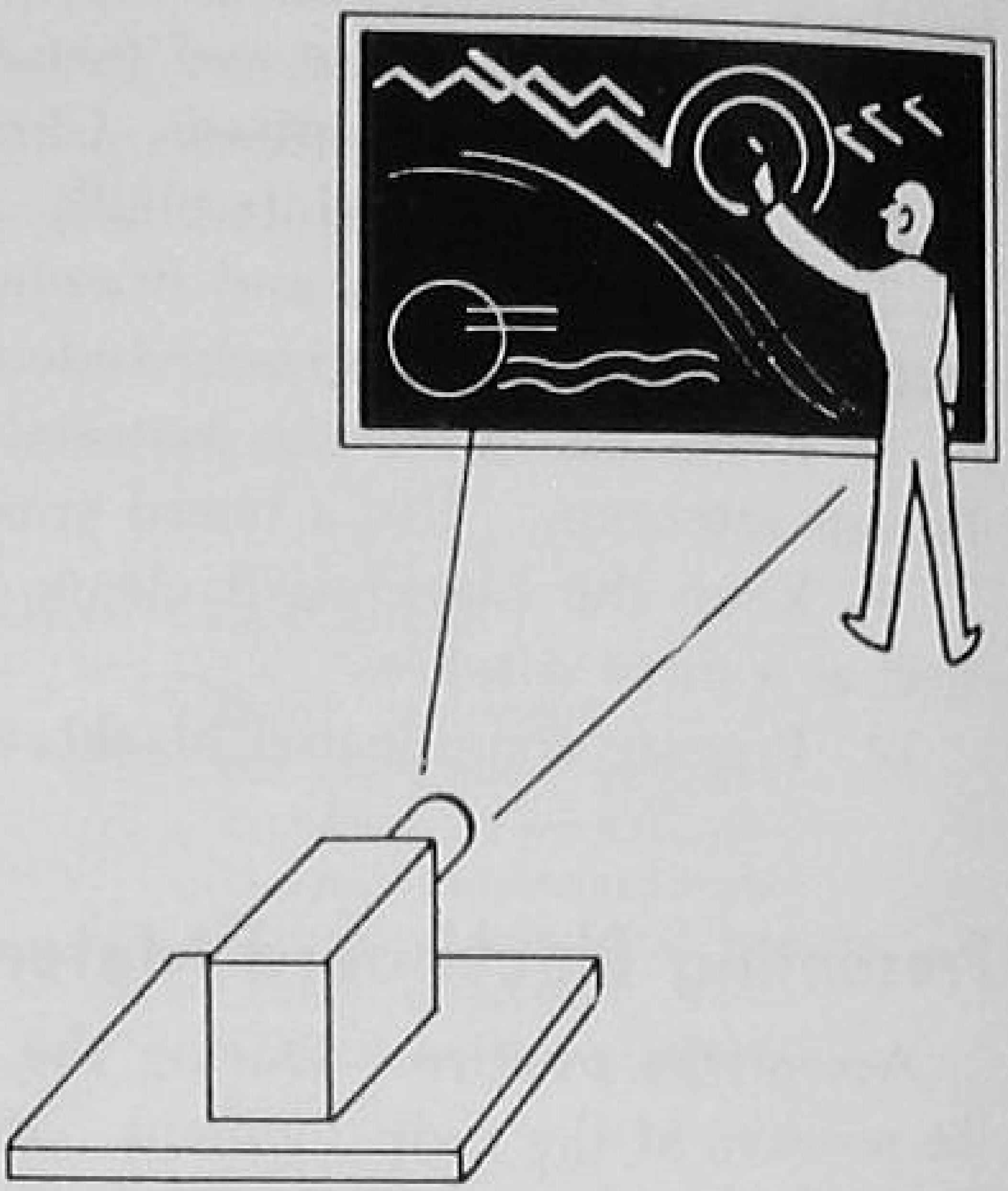
1. Underline statements to focus attention.
2. Use chrome yellow or pale green chalk.
3. Stand to one side of the blackboard.
4. Use a pointer.



Chalk talks. Make your chalk talk—and you don't have to be an artist. Use stick figures to illustrate your subject matter whenever possible. A circle for the head, a long line for the body, and shorter ones

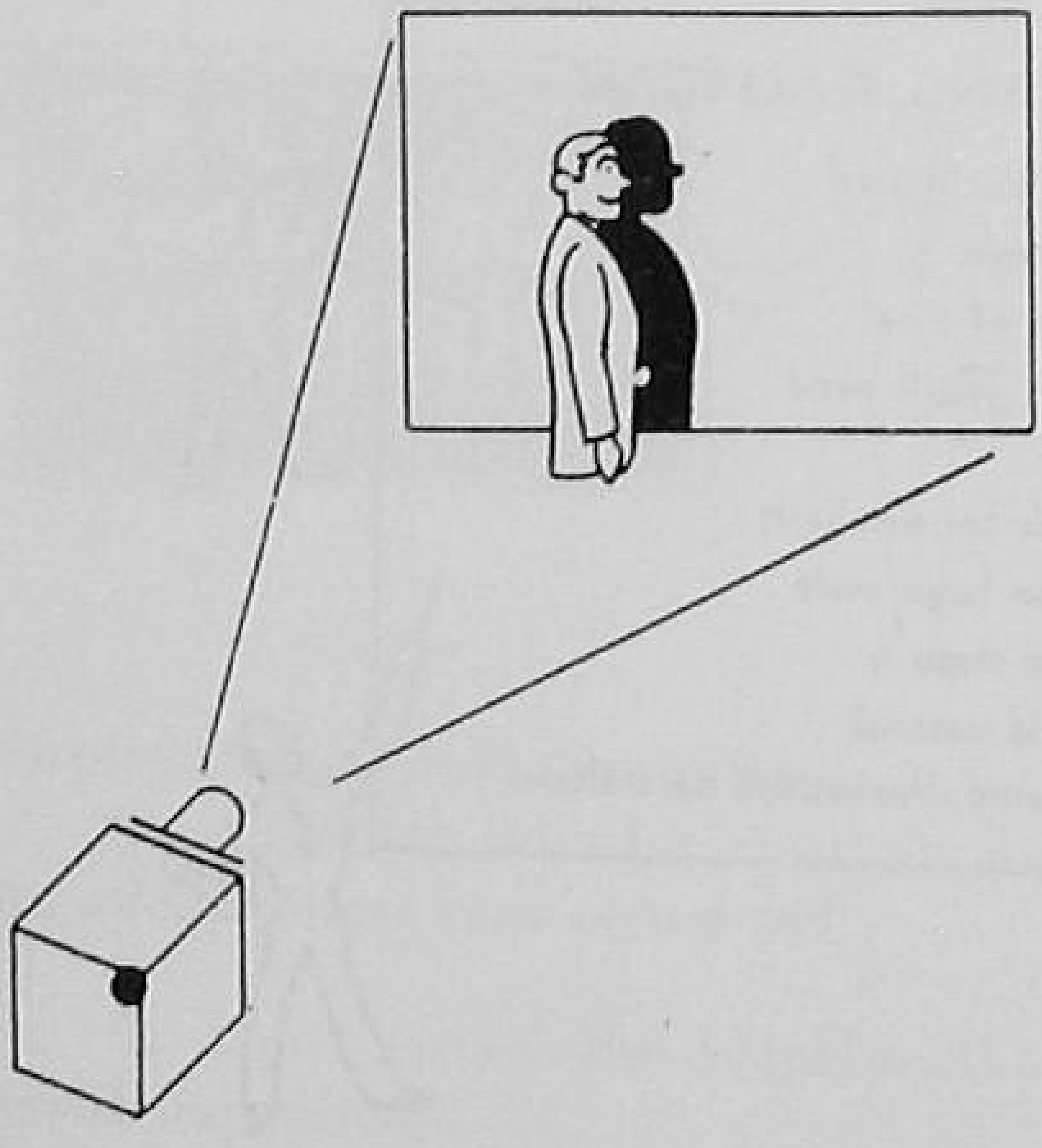
for the arms and legs, are all that is necessary. The simpler the drawings, the better. Work out your chalk talk before presenting the subject.





Tracing screen. Complicated illustrations may be placed on the blackboard with the aid of a projector. Trace the image with chalk as it is projected on the blackboard instead of a screen. If you are using a picture from a motion picture, it will be necessary to stop the machine and refocus the "still" on the blackboard. The slide, filmstrip and opaque projector are handled in the usual manner. Any picture may be placed on the blackboard in this fashion.

The silhouette of a student, for example, may be placed on the blackboard for teaching proper hair style, posture, and general appearance.



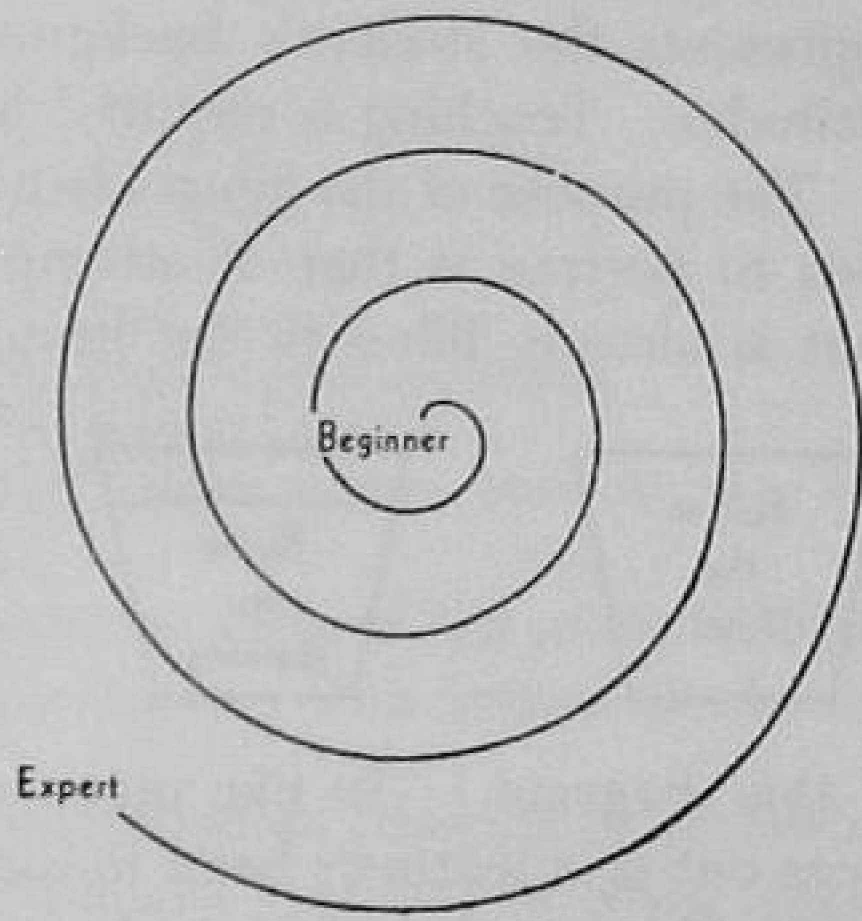
For silhouette work the following steps are suggested:

1. Focus projector light on desired space on blackboard. The slide and opaque projector are best, but the others are also suitable.
2. Darken area near blackboard if necessary.
3. Place student between the projector and blackboard. Move him back and forth until the desired silhouette appears on the blackboard.
4. Trace the outline of the silhouette with chalk.

This tracing technique opens up many new avenues for illustrating subject matter in various fields. The wide-awake instructor will find many dramatic ideas for vitalizing his presentation.

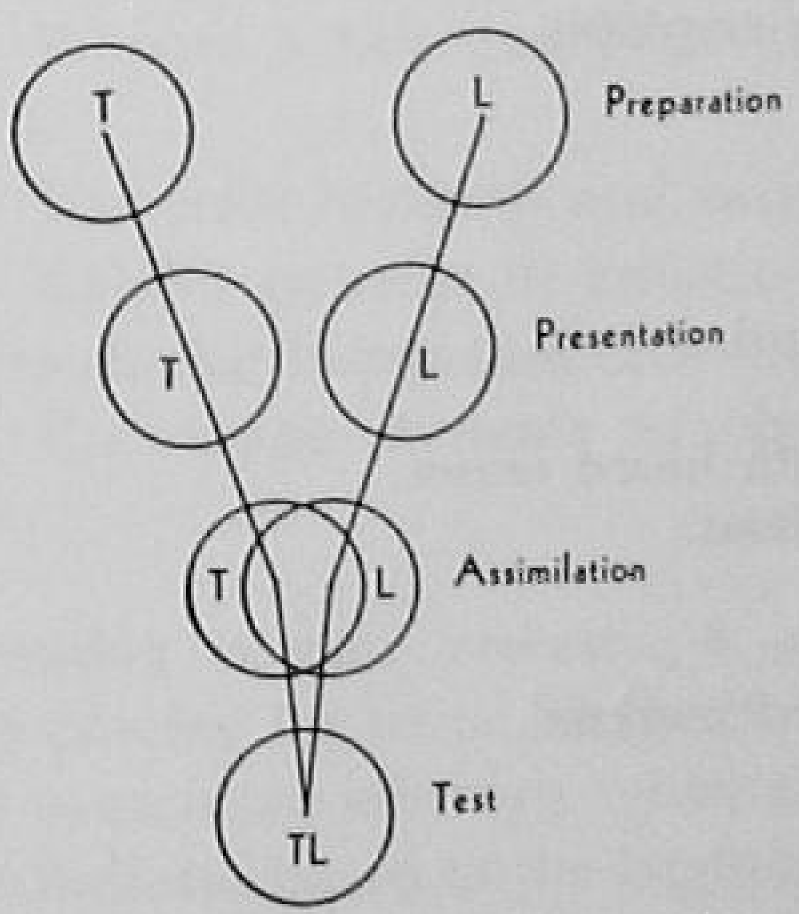
An Example of the Use of the Blackboard

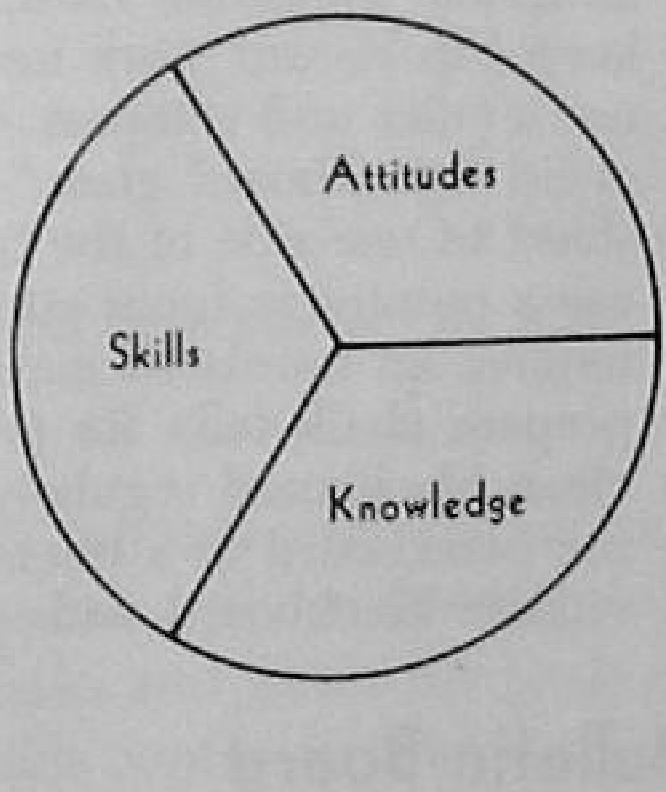
Many employees and executives of large organizations have taken such courses as Job Instructor Training, Job Methods Training, and Human Relations Training. The value of these courses is recognized by thousands of students. Much of the instructor efficiency in these courses was due to the skillful use of the blackboard by trained people.



In Texas, the State Board for Vocational Education[1] employed the following diagrams in their Job Instructor Training courses. Sometimes the illustrations were placed on the blackboard before the group met. However, when they were drawn during the teaching session, the actual process of drawing usually gave more life and meaning to the diagrams.

The illustration above shows the importance of the instructor's getting on the student's level when he instructs. The center of the diagram represents the beginner who gradually develops on his job until he becomes the expert on the outer rim. The instructor must determine what stage the student has reached and start his instruction at that point. Too many start instruction at their own stage of learning, and, consequently, fail to teach the student.





The illustration at the left is a diagrammatic representation of the four basic steps in teaching, whereby the instructor transfers what he knows to the student until the latter knows what the teacher knows.

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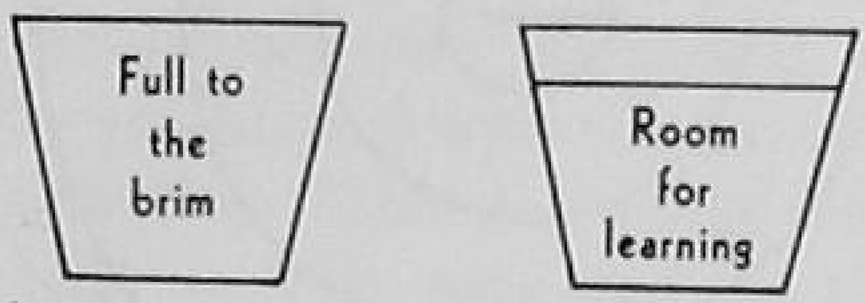
[1] Illustrations courtesy M. A. Browning, State Department of Education, Austin, Texas.

The important point to bring out in this diagram is the coming together of the teacher and the student in the third step, the teacher taking part in helping the student to assimilate and apply information.

The familiar pie graph can be used effectively in discussing types of teaching situations under HOW TO GET READY. The entire circle represents the student's background, including skills, knowledge, and attitudes. Teaching is required in all three of these types of learning.

The purpose of the figures below emerges in the act of drawing. The idea to portray is that of attempting to put more water into a bucket that is already filled to the brim. Of course the water overflows and nothing is accomplished. The only way to get more water in is to get some of it out by kicking the bucket or by some equally drastic method. (A vivid word picture should accompany the drawing of this diagram.) In like manner, it is sometimes necessary to get old ideas out of a learner's head to make room for new information.



Another good analogy is the process of making more room in a basket of potatoes by shaking down the basket. The process of shaking dislodges the potatoes and, at the same time, makes room for new ones.

"The student should be lifted by teaching and good relationships to a point where he feels that he is being assisted to do a better job."

DO's for Using the Blackboard

DO use blackboard as a "point clincher."
DO make all drawings and captions on a large scale.
DO prepare complicated layouts before class meets.
DO use yellow or pale green chalk for emphasis.
DO underline important facts.
DO keep blackboard work neat.
DO use a ruler and compass.
DO avoid "blackboard glare."
DO stand to one side of the blackboard.
DO use a pointer to focus attention.
DO remove all unrelated material with board eraser.
DO prepare chalk talks for job problems.
DO clean blackboard regularly.
DO use blackboard as a tracing screen.
DO vitalize blackboard with projected material.

The Bulletin Board

An effectively used bulletin board is much more than a piece of cork or a burlap cloth upon which odds and ends are placed. A good bulletin board is a *vital, animated* tool when used to arouse student interest, to develop efficiency, and to follow up blackboard work and other teaching aids.

How to Use the Bulletin Board

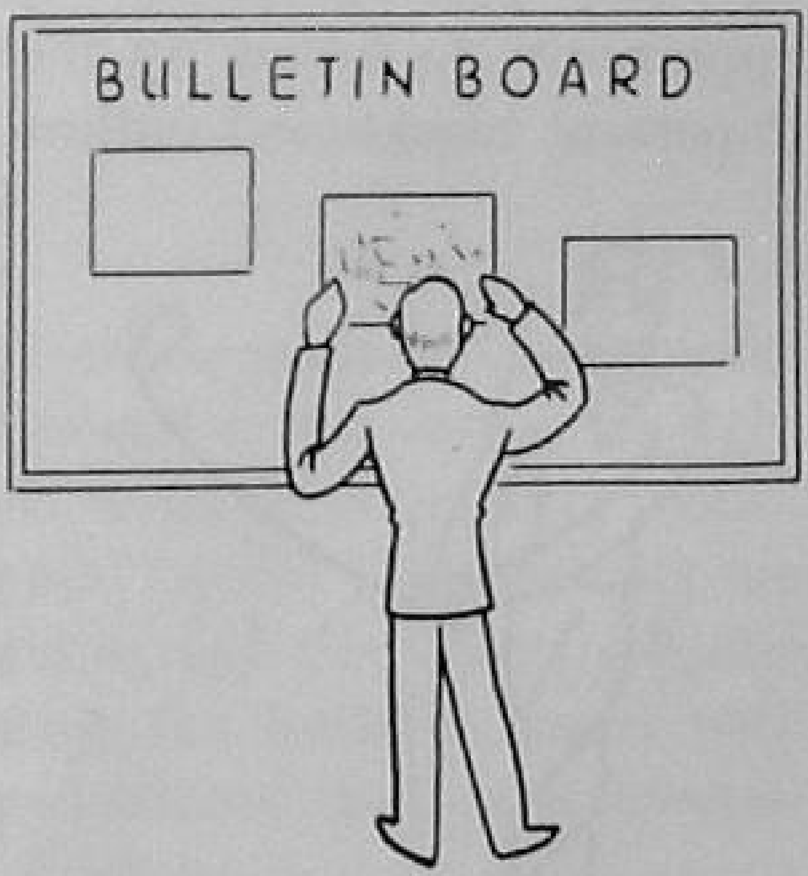
Bulletin-board items. Bulletin boards may be used to display numerous items, such as:

1. Personal news
2. Announcements
3. Booklets and brochures
4. Bulletins
5. Cartoons
6. Charts
7. Diagrams
8. Posters
9. Maps
10. Newspaper clippings
11. Drawings
12. Graphs
13. Notices
14. Pictures
15. Pamphlets
16. Photographs
17. Post cards
18. Models and specimens
19. Subject outlines
20. Trainee progress records

Bulletin-board system. Placing a conglomeration of the material listed above on a bulletin board would be disastrous. The instructor should:

1. Collect suitable illustrations for instructional projects or problems. Eventually he will have enough bulletin-board material to cover nearly all subjects.

2. Classify and file material for use at the right time. Be alert for new materials and do not hesitate to discard the old ones.



3. Select illustrations pertaining to the specific subject or area under consideration.

4. Arrange illustrations on bulletin board in an interesting manner.

5. Prepare a title and brief description.

6. Use color harmony and balance.

7. Exhibit or refer to bulletin-board pictures during instruction time.

8. Encourage students to observe and contribute to the bulletin board.

Arousing student interest. A student's interest may be aroused by simply placing his name on the bulletin board; a chart showing his progress is even more effective. Listing the tasks and dates for each student on the bulletin board at the beginning avoids confusion later.

Interest may be aroused in a subject by placing an announcement on the bulletin board pertaining to it. For example, "A motion picture will be shown tomorrow on 'How to Increase Your Efficiency.'" Some teaching films are accompanied by "blow-ups" suitable for this purpose.

Another method for arousing interest in a topic is to arrange an in-

teresting bulletin-board display several days prior to the introduction of new subject matter. The display must have "reader interest" and sufficient time should be allotted so that the student has ample opportunity to observe it.

Developing subject matter. The illustrations which are used on the bulletin board may be removed from the display and used during your subject-matter presentation.

If the bulletin board is portable, place it in front of the classroom, and if the illustrations are large enough for everyone to see, it will not be necessary to remove the pictures. On the other hand, if the illustration is small and the details important, it will be necessary to use the opaque projector. However, in most cases this will not be necessary. It is also helpful to have the illustrations arranged on the bulletin board in the proper sequence, that is, the order in which you will present the various steps to the class.

Stand to one side when presenting bulletin-board pictures, and use a pointer to direct attention. Illustrations not pertaining to the specific subject matter being presented should not be placed on the same bulletin board.

"Keep your eye on the ball." The bulletin board offers an excellent opportunity to follow up the use of the blackboard. For example, an important blackboard outline may be transposed to the bulletin board in simple chart form at the completion of the subject under discussion. Illustrations pertaining to this specific outline may also be displayed.

Flash cards, charts, pictures, photographs, posters, graphs, and diagrams that were used during the subject presentation may be reviewed advantageously when displayed on the bulletin board.

Subject matter presented by motion pictures, filmstrips, slides, and the opaque projector may be reviewed by displaying related material on the bulletin board immediately after the showing.

The *follow-through* is important in sports, but even more important in good teaching. The bulletin board is your opportunity for a follow-through.

Bulletin board titles. Interesting titles may be prepared by drawing or printing them, cutting them from magazines and newspapers, and by using the opaque projector. The opaque projector offers an opportunity for duplicating attractive and complicated titles by projecting the desired material on a sheet of paper and then tracing the image on it.

How Students May Contribute Items

Classrooms should have more than one bulletin board, one being devoted to student use. At the beginning of the school year, prepare a list of important general subjects or topics and encourage the student to select one that especially interests him. Designate specific dates for changing the bulletin board and allow the student sufficient time to collect material. Give a few points on the use of the bulletin board and let the student proceed to express himself. You will be amazed by some of the original and creative displays that will be developed by students.

The following directions are suggested for bulletin boards:

1. Remove old display.
2. Clean and dust bulletin board.
3. Set up display.
4. Prepare interesting title.
5. Relate all illustrations to the specific subject or topic to be considered.
6. Caption all illustrations.
7. Keep bulletin board neat.
8. Make it tell a story.

How to Make Bulletin Boards

Beautiful glass-enclosed bulletin boards are comparatively inexpensive, but a simple home-made one is just as effective and costs very little.

Bulletin boards can be made of cork, soft wood, burlap cloth, monk's cloth, heavy brown wrapping paper, masonite board, Celotex, and numerous other fiber boards. Cork is preferable, but the others are also suitable. Add color by occasionally painting the bulletin board with pastel colors or water paint. Friar's cloth and billiard cloth give interesting effects when stretched over a soft wood backing.

The size of the bulletin board will depend upon the size of your classroom.

It should be placed at least three feet above the floor in an area that is well lighted at all times. In some rooms, blackboards have been successfully replaced with bulletin boards at each end. This relationship between the blackboard and bulletin board makes it very easy to correlate the work on each.

The bulletin board may be attached to the wall with a small frame, hooks and eyes, and wire, or it may replace slate space in a blackboard.

A portable bulletin board possesses an adaptability that is desirable in many teaching situations: it can be easily moved from one section of

the room to another to give specific emphasis to the topic under discussion.

DO's for Using the Bulletin Board

DO capitalize on all bulletin board space in classroom.
DO use bulletin board to arouse student interest.
DO use bulletin board to develop subject matter.
DO use bulletin board to follow through other teaching aids.
DO collect suitable material for bulletin board.
DO classify and file material used on bulletin board.
DO use pertinent illustrations.
DO arrange pictures in orderly and interesting manner.
DO create original titles.
DO use color harmony and balance.
DO caption all illustrations.
DO change material frequently.
DO make bulletin board tell a story.
DO make your own bulletin boards if none are available.
DO make them large enough.
DO place them where they can be easily seen by all students.
DO experiment with portable bulletin boards.

QUESTIONS

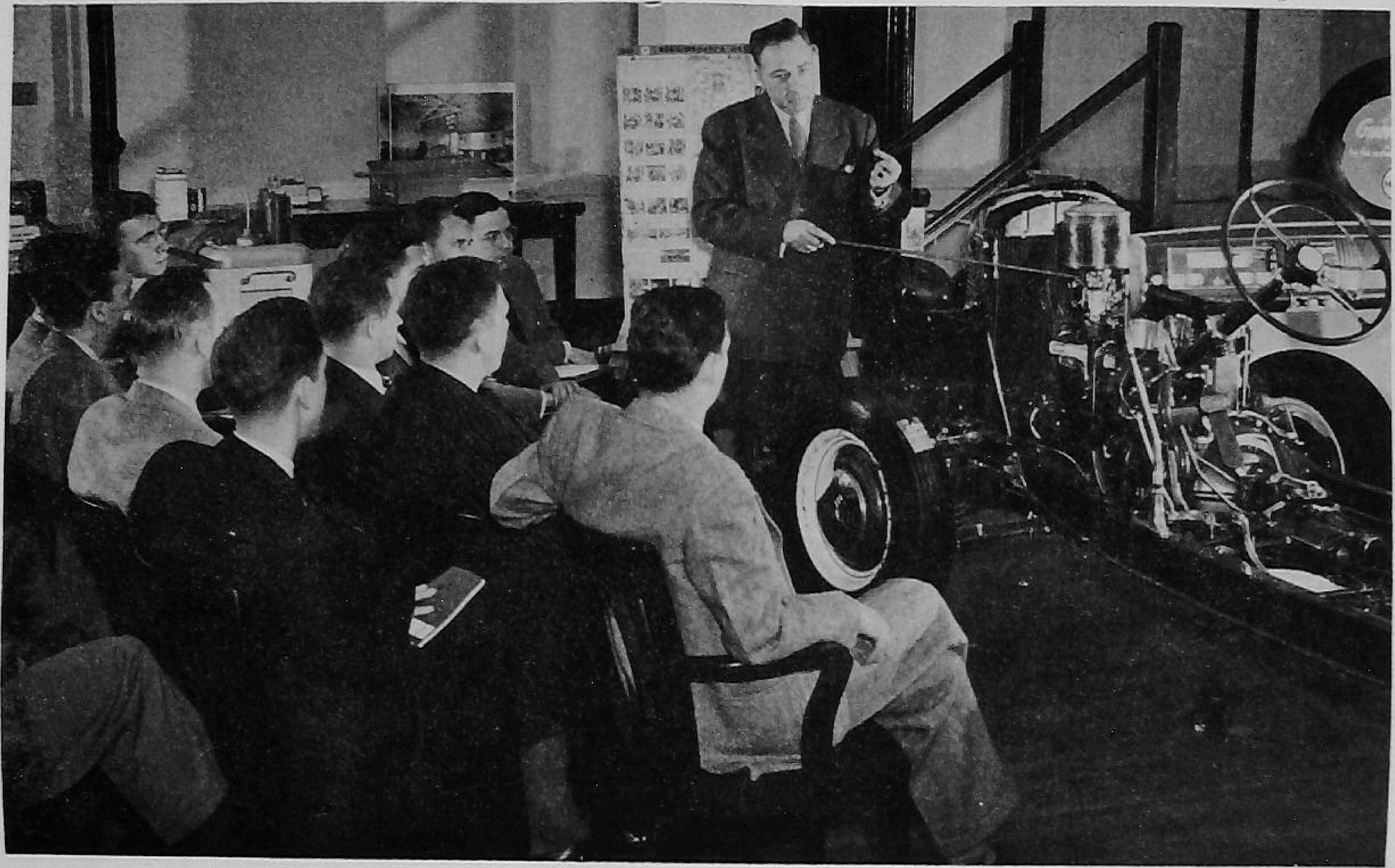
1. What are the advantages of blackboards?
2. For what items may a blackboard be used?
3. Why should blackboard work be simple and brief?
4. What are the rules for effective blackboard use?
5. How may blackboard material be emphasized?
6. How may the blackboard be used for chalk talks?
7. How may the blackboard be used for training screen work?
8. What are the "Do's for using blackboards?"
9. What items may be placed on bulletin boards?
10. What is included in a bulletin board "system?"
11. How may bulletin boards be used to arouse learner interest?
12. How may learners participate in contributing items for a bulletin board?
13. What eight rules are suggested for learner bulletin boards?
14. How would you *make* a bulletin board?
15. What are the "Do's for using the bulletin board"?

PROBLEMS AND PROJECTS

1. Prepare to demonstrate good blackboard usage to class. Any topic or subject may be selected to show good blackboard technique.
2. Prepare to show how to give a "chalk-talk." Any appropriate subject may be selected for this purpose.
3. Prepare to show how to use a "training screen."
4. Prepare a demonstration showing how to use a good bulletin board system—including selection of items, how to place items, how to locate bulletin boards, how to make bulletin boards.

5. Explain how you would use bulletin boards to arouse the interest of students or employees.

6. Prepare a brief written report on the following items:
   a. Survey your school, business or other organization to determine if, where, and why bulletin boards would be advantageous.
   b. If they would be advantageous, prepare a floor or wall plan, and indicate on it where you would locate bulletin boards. Also, indicate *why* you located your bulletin boards as you did.
   c. Describe how you would construct your bulletin boards, materials to be used, and other details.
   d. Describe how you would arrange materials on your bulletin board, and how you would manage it.
   e. Indicate how you would "sell" the advantages of bulletin boards to school administrators.



Courtesy of Socony-Vacuum Oil Co.

Using the cutaway model of a popular car to explain the part that the carburetor plays in the function of an automobile.

10

Objects, Specimens, and Models

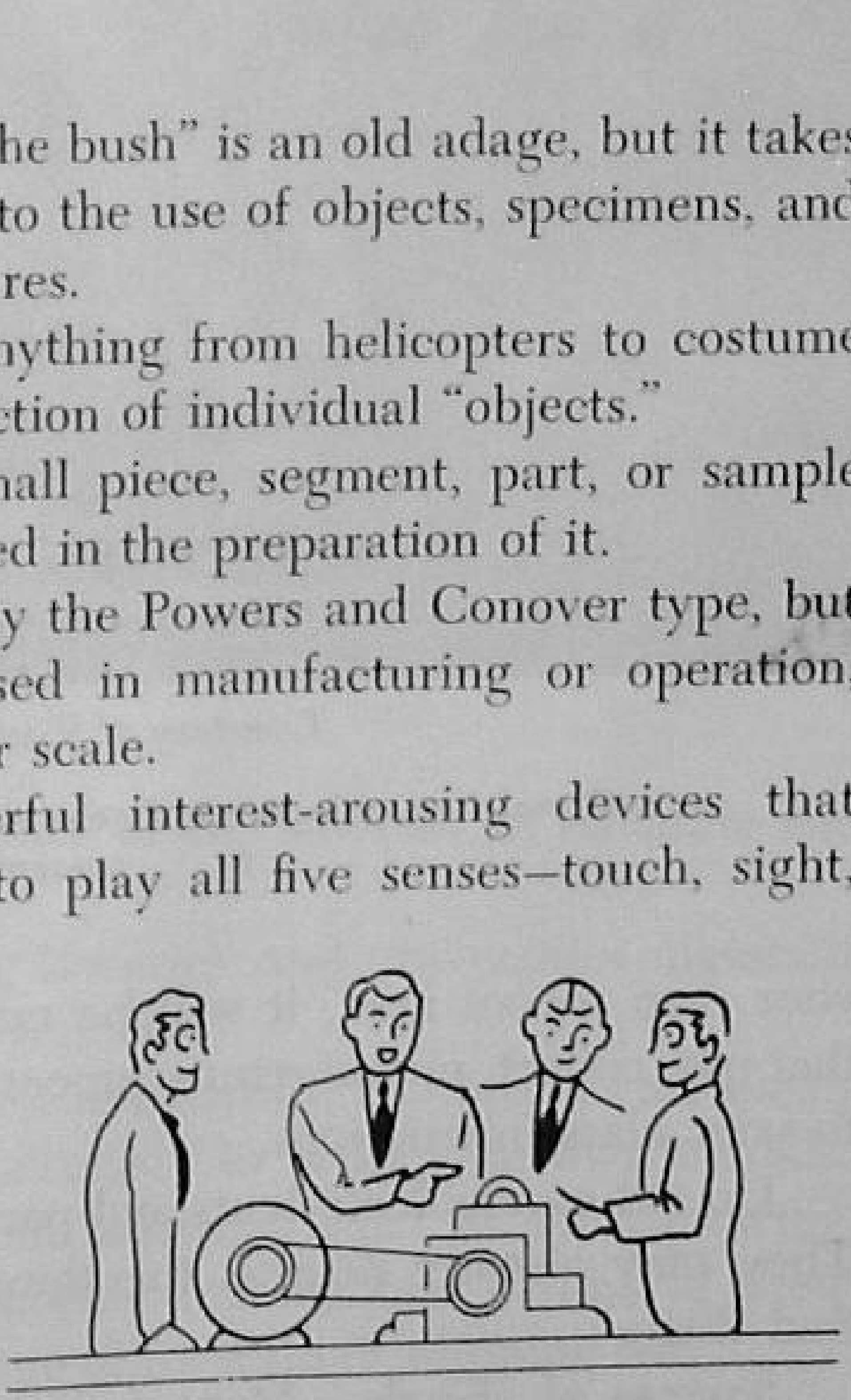
"A bird in the hand is worth two in the bush" is an old adage, but it takes on new meaning when it is applied to the use of objects, specimens, and models in effective teaching procedures.

Objects. This group includes anything from helicopters to costume jewelry. The term refers to a collection of individual "objects."

Specimens. A specimen is a small piece, segment, part, or sample of the real object, or the material used in the preparation of it.

Models. Models include not only the Powers and Conover type, but also replicas of significant units used in manufacturing or operation, usually copied on a smaller or larger scale.

These teaching aids are powerful interest-arousing devices that possess the capacity of bringing into play all five senses—touch, sight, hearing, smell, and taste. An instructor who capitalizes on as many of these senses as possible increases the efficiency of his teaching proportionately.

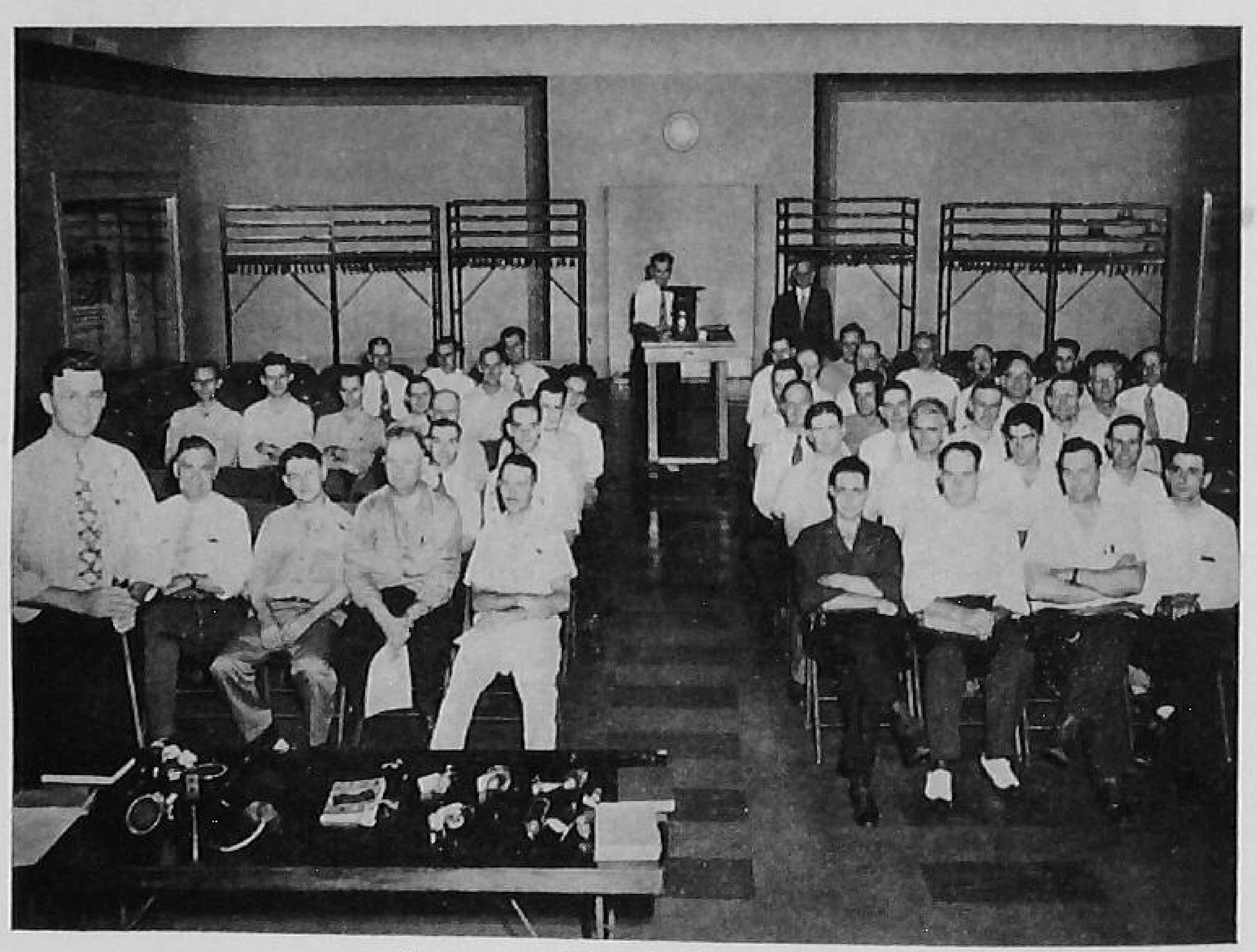


It is not necessary to bring a camel or a llama to a classroom to study its hair—a small specimen of it will suffice; nor is it practical to set up a B-29 bomber in the classroom when the desired results can be obtained by using the engine only or a

small model of the aircraft. When it is physically impossible or impractical to use the real object in the classroom, a model or specimen will do the trick. In fact, in many situations these aids are more effective than the actual object.

Sources of Objects, Specimens, and Models

First utilize the sources in your own school or community. Local merchants, manufacturers, and processors usually extend their full co-operation in an effort of this type. After exhausting the possibilities in



Courtesy of Visual Education Division, General Electric Co.

Correlating objects, specimens, and models with a sound slidefilm presentation.

your own school area, it will be necessary to contact outside concerns that use, collect, manufacture, process, sell, or distribute materials related to your class instructions.

Do not overlook students and parents as excellent sources of material. They may already possess the things needed, or may know where to find them.

Sources of objects. Many inexpensive, staple objects should be purchased outright and made a permanent part of the classroom. However, the majority of objects may be obtained from local merchants, manufac-

turers, or producers on a loan basis. The school and instructor should assume the responsibility of protecting the objects against damage, soiling, and theft. Keep a careful record of all borrowed items, and return them as soon as they have served their purpose.

Sources of specimens. A letter to almost any manufacturer or processor in the country will bring excellent specimens of his products, and occasionally a complete exhibit will be sent free of charge. However, a large number of specimens may be obtained in your own local plants,

Courtesy of Sears Roebuck & Co.

Demonstration and practice with an actual model.

farms, and stores. Invite the assistance of the students to facilitate the collection of these specimens.

State and local museums, lending libraries, and universities maintain and distribute large collections of specimens.

Sources of models. Models are not as plentiful as objects and specimens, and in many cases it will be necessary to make your own models.

Lending libraries, universities, and museums such as the following have large collections of excellent models and exhibits. Most of their material may be obtained free of charge or for a small shipping fee.

The Commercial Museum, Philadelphia, Pa.
American Museum of Natural History, New York, N. Y.
Field Museum of Natural History, Chicago, Ill.

Each branch office of the National Cash Register Company is equipped with a complete set of store models, which are used chiefly to assist merchants in store layout, but which also may be used advantageously in other phases of education.

Other potential sources of models are equipment and fixture companies, architects, stores, and industrial units that have just been remodeled or built, and numerous manufacturers who have prepared models to facilitate the sale of their products. Commercial organizations, such as A. J. Nystrom & Co., 3333 Elston Avenue, Chicago 18, Illinois, have developed a large variety of models for classroom instruction. Catalogues are available, usually free of charge.

How to Prepare Objects, Specimens, and Models

The talents of the individual instructor and student should be utilized to the fullest extent in the preparation, mounting, and preserving of these aids.

Commodities and similar objects do not require special preparation, since they are obtained in finished form. However, there should be ample space for displaying and storing this material in the classroom. Equipment and other facilities will be discussed in the following chapter.

In order to facilitate accessibility, filing, and use of specimens, they either should be placed in clearly marked cardboard cartons, glass, and cellophane containers, or should be mounted. The type of mounting used will depend to a large extent on the kind of specimen. The following directions will enable the instructor to mount adequately the majority of specimens used in teaching situations:

Mounting specimens. Proper mounting of specimens includes the following procedures:

1. Secure shallow cardboard box.
2. Cut a piece of stiff cardboard to fit snugly in the bottom of the box.
3. Lay out the specimens on the sheet of cardboard in an artistic fashion.
4. Mount specimens, such as cotton, wool, silk, and other soft items directly on the cardboard with a large needle and thread. Metal, plastic, wood, and other solid items may be mounted by tying them to the cardboard with heavy thread or thin wire. Use a pointed instrument, such as an awl or an ice pick, to prepare neat holes for the thread or wire. Tie the knots on the back of the cardboard. Delicate specimens may be mounted on a thin layer of absorbent cotton which has been placed on the sheet of cardboard in the bottom of the box.
5. Label each specimen. Typewritten labels are attractive and

effective and may be pasted directly on the sheet of cardboard near the specimen.

6. Place the sheet of cardboard in bottom of the box. If necessary make it secure with paste, glue, or scotch tape.

7. Fragile specimens may be protected by covering the top of the box with a sheet of cellophane. Carefully fold the cellophane over the sides of the box and attach it with scotch tape.

8. Place a clearly visible label on the box to identify the contents.

9. Cover the box with the lid for storing.

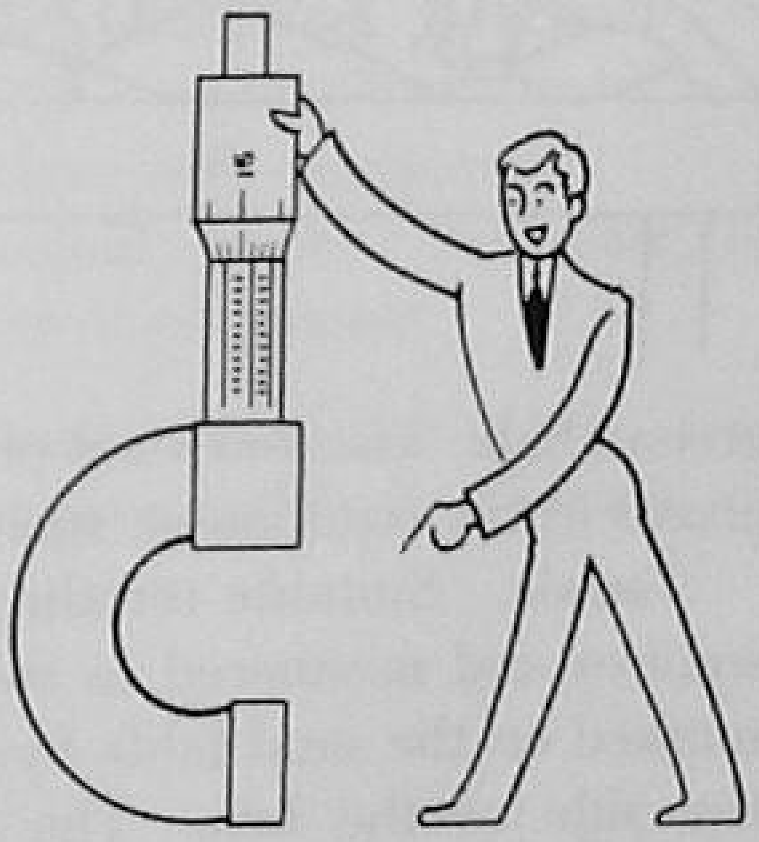
10. Use a storage place that will protect the specimen boxes from crushing and deterioration.

Specimens such as textile swatches, for example, which require close inspection and student handling for complete assimilation, should be mounted on individual 3 by 5 by 7-inch index cards. Place the specimen in the upper left-hand corner of the card. Glue or paste only the upper edge, to permit the lower end to hang free. This will allow the student to feel or examine the sample minutely. The remainder of the card should contain (1) name of fabric, (2) kind of fiber, (3) type of weave, (4) brief description, (5) advantages, (6) disadvantages, and (7) uses.

Kinds of models. The models used may be divided into three general groups: (1) solid, (2) "X-ray," and (3) working.

Solid models are used chiefly for their external features, such as developing a store layout with small-scale counters and fixture models.

"X-ray" models are used chiefly to reveal internal construction, such as a cross-section model of a motor showing its hidden features.



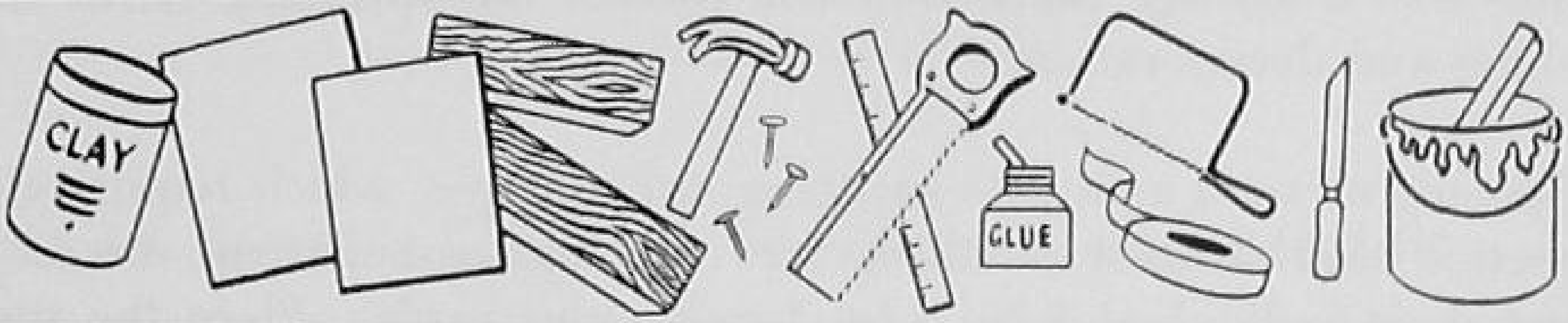
Working models are used chiefly to demonstrate operation or processes, such as model vacuum sweepers and washing machines. In some cases, such as automobile motors, the model is encased in glass or made with a cut-away part.

Good "X-ray" and working models are difficult to make and usually require the services of an expert model maker. However, the solid models are easy to make, the only requisites being skill, ingenuity, and imagination. The model should also have (1) a convincing resemblance to the actual object, (2) a suitable size for the teaching purpose, (3) a durable construction, and (4) it should be convenient to handle.

Materials. Models can be built from water clay, plasticene, heavy cardboard, wood, wallboard, or plywood. In many cases, scraps of

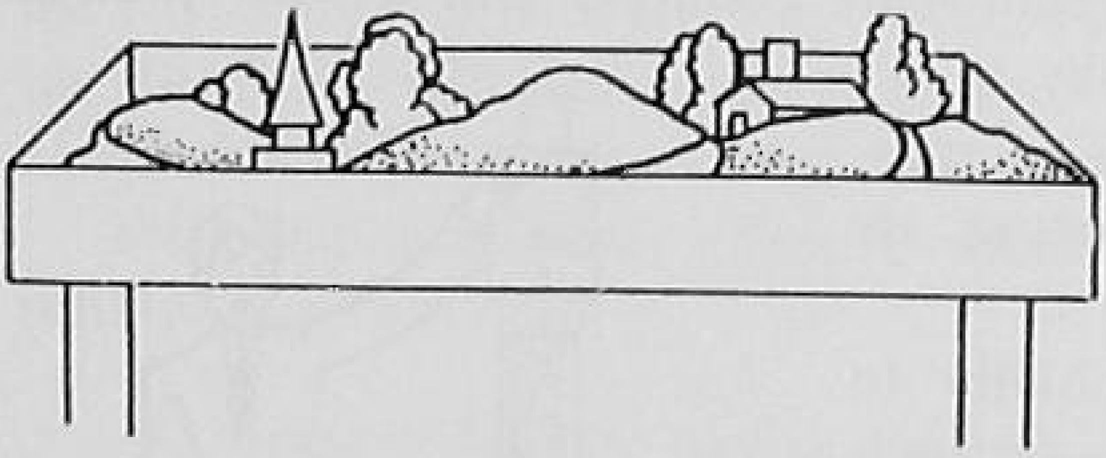
these materials, which would ordinarily be discarded, are adequate for the preparation of smaller models. Select the material which equals the desired unit scale in thickness. For example, if the scale were ¼ inch to 1 foot and the object were 4 feet high, the best material to use would be 1 inch thick.

Tools. Most models can be constructed with a ruler, pencil, small nails, hammer, knife, saw, and glue. A coping saw, similar to the one used in cutting "jig-saw" puzzles, would be excellent.



Sand tables. Agricultural, mining, geographical, and numerous other projects dealing with terrain and topographic layout may be vividly illustrated by the use of a simple sand table.

The sand box or tray should be built of suitable lumber and should be tarred before the damp sand is put in to prevent warping. The exact size of the box will be determined by the specific teaching needs. A useful size for smaller job problems is 3 by 4 feet, and 8 to 10 inches deep; for larger projects, the box or tray should be 5 by 10 feet or larger.



Other necessary materials are plasticene; water clay or sand that can be molded when wet; shovel; rake; sprinkling can; large bucket of water; bucket for mixing sand and water; string; thumbtacks; blue and green chalk; assorted sizes of wooden blocks to represent buildings; and pieces of toy equipment, such as trucks, tractors, wagons, and boats.

Terrain. Suitable terrain is selected on a map which is divided into squares and numbered as suggested in Chapter 5. Similar squares are marked on the sand table by cords fastened at the proper intervals along the side of the box. The important features, such as hills, valleys, streams, and roads are then molded in the sand.

Buildings and other outdoor units. These can be constructed from thin wood, wallboard, cardboard, or clay to represent the size and shape of the originals.

Woods. Masses of trees can be fashioned from sponges, modeled clay, or any scrap materials. Pieces of cardboard or wood, roughly shaped with a knife, are satisfactory. If the model is large scale, the

trunks and branches of the trees can be made by twisting together several strands of picture wire for the trunks, splitting and twisting the ends for the branches; or actual branches of shrubs that resemble tree trunks and limbs can be used. Steel wool or sponges can be cut into foliage shapes, and fastened onto the branches. A more realistic effect is obtained by spraying the foliage masses with shellac, sprinkling them with sawdust, and spraying them with green paint.

Fields. Open fields can be readily simulated by roughening the surface of the clay, or by sprinkling it with sawdust, and then covering it with suitable colors or coating it with chalk.

Water. Oceans, lakes, streams and other bodies of water can be represented by covering the area with a mirror, glass or cellophane, or by painting the area blue.

Trucks, tractors, boats, and other equipment. Toys that are suitable for use in the sand box may be frequently purchased. However, if they are not available, they can be constructed from wood, metal, rubber, cardboard, and other similar materials. Local variety stores carry a multitude of such objects.

Store layout project. A simple set of models may be prepared for use in a plant, farm, or store layout training project by using the following directions.

1. Use scale ¼ inch to 1 foot.
2. Cut piece of smooth cardboard to represent floor.
3. Rule guide lines on cardboard horizontally and vertically to show scale and facilitate spacing.
4. Measure off desired lengths on 1-foot moulding, wallboard, or plywood.
5. Cut with saw, and then smooth the edges with sandpaper.
6. If desired, the models may be varnished, painted one color, or painted to represent different types of objects or equipment.

Dominoes, checkers, building blocks, metal construction sets, and many other toys may also be adopted for use as models in all levels of the school.

Dioramas

The term "diorama" is derived from the Greek and means "to see through." It really is a medium that enables a teacher to bring little sections of the world into the classroom for pupils to examine and study at close range.

Dr. Irene F. Cypher,[1] director of the New York University Film

[1] Irene F. Cypher, *The Development of the Diorama in the Museums of the United States,* New York University, Ph.D. Thesis, 1942.

Library, who is an authority on dioramas, defines the word as follows: "A miniature, three-dimensional group consisting of small modeled and colored figures and specimens, with accessories, in an appropriate setting, and in most instances, artificially lighted. The scale and size of the group are variable; there is no standard shape; there is no limitation as to subject matter, which may be realistic or imaginative according to what the creator of the group wishes to portray." It may portray some section of the world, a group of people, a fanciful concept, a primitive ceremony, some historical incident, legendary story, or modern scene.

Forerunners of the diorama are found in the religious crib or manger displayed at Christmas time, in stage sets, in miniature carved model sets, and specifically in the panoramas and habitat groups usually found in museums. Habitat groups, particularly those dealing with science and natural history, exhibit life-size animals and birds in their native surroundings. This type of display calls for a high degree of craftsmanship and is quite expensive.

The diorama, on the other hand, is less costly and better adapted to a wide variety of purposes. Historical subjects in particular can be effectively shown. In fact, dioramas with miniature human figures are actually more realistic than habitat groups in which life-size figures appear in stiff, unlifelike attitudes.

The diorama developed by museums and made available to schools through their circualting study collections usually consists of an oblong case in which is a group set against a curved, painted background. The technique of making this background is the same as that used for museum groups. It is highly important that the background be curved because this represents the actual curvature of the earth and enables the maker of the group to suggest that the whole scene is a small segment of actuality. A foreground is then fitted into the case, and figures and accessories are placed in position.

Preparing the diorama. Modeled figures of wax or clay are best because they contribute to the desired illusion of reality. Since real people and objects have roundness and thickness, modeled figures help to bring the carryover from unreality to reality. If the objects in a diorama are of cardboard or paper, they should be of sufficient thickness to give an illusion of body. The point to bear in mind is that the effectiveness of the entire arrangement depends upon forced perspective, rather than on the well-known lines of proper perspective.

Lighting may be provided by means of an electric bulb set into the top of the case, or the diorama may depend entirely upon natural light falling into it. Generally speaking, artificial lighting enhances the total effect and ensures uniformity.

Dr. Cypher also makes the following specific suggestions for preparing dioramas for use in your own classroom.

Important steps in the construction of a diorama:

1. Choose subject
2. Read all available material on subject
3. Obtain illustrations, preferably colored, from *National Geographic, Travel Magazine, Holiday*, and other similar publications
4. Plan the layout and make sketches
5. Take fauna and flora into consideration
6. Visit Museum halls

Groundwork—Built on corrugated cardboard with wooden frame

1. Irregular surface
   a. scraps of cardboard with tapered edges
   b. cloth covered with wax
   c. screening or wire netting with burlap and plaster of paris
2. Smooth surface
3. Earth effect
   a. sifted earth on glue
   b. sand on glue (plain or colored)
   c. painted wood shavings on glue
4. Swamp or wet effect
   a. same as #3 only shellac after glue has dried
5. Snowy effect
   a. plaster of Paris
   b. paraffin wax colored with oil paint
   c. white paint
6. Water effect
   a. paraffin wax colored with oil paint
   b. glass colored with oil paint
   c. lumarith

Dwellings

1. Framework
   a. wood, wicker, corrugated cardboard, bristol board
2. Exterior
   a. bark—absorbent paper or cloth coated with wax
   b. thatch—hemp, straw, dried grass, paper cut in thin strips, excelsior, sisal
   c. hide—chamois, buckskin, paper dipped in wax, old leather
   d. rock—gravel on glue, cloth over a framework coated with paraffin wax, glue and earth
   e. plaster of Paris over crushed newspaper, cotton waste or wire netting and burlap
3. Color
   Paint with oil paint or tempera

Accessories

Grass—excelsior tied in little bunches and painted, hemp, flax, bristles, dried grasses, sisal, thin strips of paper, green sweep sawdust if obtainable, or ordinary sawdust painted with dry colors.

Shrubs—Sponge, caribou moss, balsa wood, wire armatures covered with cotton and wax, small dried plants.

Trees—Trunk, suitable branch with twigs. Wire coated with cotton, plaster of Paris and wax

Leaves—Dennison Duplex crepe paper—Duco cement—oil paint thinned with turpentine—wax
Bits of sponge

Figures

1. Armature made of 4 twisted wires.
2. Plasteline—model with arms and legs outstretched, then bend into position.
3. Water clay—model the same as #2. This clay must be kept wet while working. Likely to crumble.
4. Pipe cleaners for small figures.
5. Mould—For lasting results this method should be used
   a. Make a base and wall of plasteline
   b. Embed ½ of already-modeled figure
   c. Grease figure
   d. Mix fairly thick plaster, pour and let set
   e. Separate—leave figure embedded in plaster
   f. Build wall around ½ mould
   g. Cut keys
   h. Coat surface of ½ mould with grease (tincture green soap, grease)
   i. Pour other half and let set
   j. Cut duct
6. Cast
   a. Heat beeswax
   b. Place mould in warm water until completely saturated
   c. Wipe off excess water from mould
   d. Tie halves together
   e. Pour mould full of wax through duct
   f. Place wires in legs before wax chills
   g. Place in cold water to chill wax
   h. Open mould and remove cast
7. Trim cast
   a. Soften with warm water and bend into position desired
   b. Smooth with fine sandpaper and then rub with soft rag dipped in turpentine
8. Clothing
   a. Bits of cloth
   b. Often can be worked from wax

SUGGESTIONS for tools and materials for classroom use

Scissors
Knives
Saws
Pliers
Hammers
Nails
Tacks
Wood Strips
Corrugated Cardboard
Cloth, Glue

Paint Brushes
Wire Cutters
Drill
Needles & Thread
Pins
Wrapping Paper
Wire
Wax
Paint
Plasteline

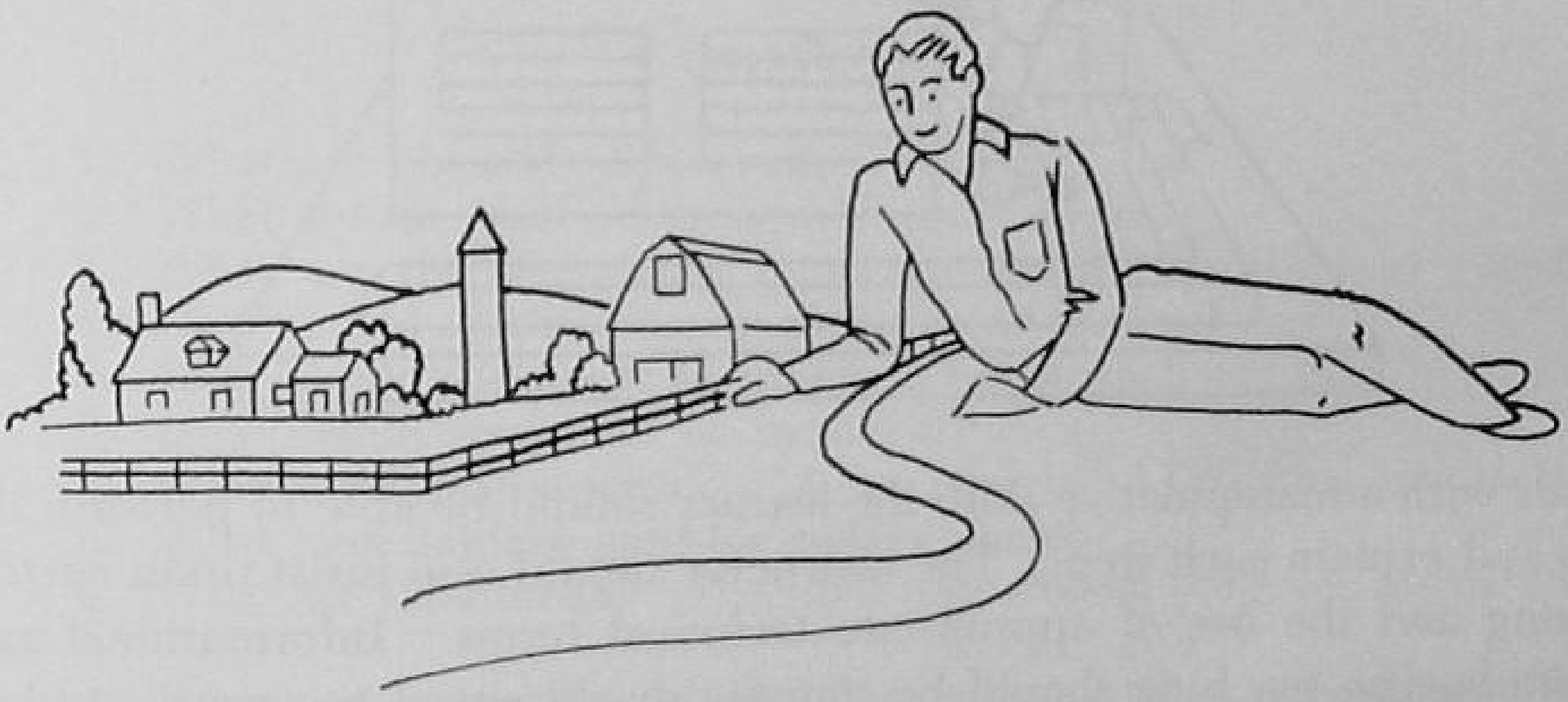
The majority of tools listed above can be purchased in the 5 and 10 cent store. Corrugated cardboard and wood can be obtained by getting corrugated cardboard cartons and wooden boxes from your neighborhood grocer. New cloth is not necessary as clean rags will do in most cases. Write directly to Dr. Irene F. Cypher, New York University, New York, N. Y., for further information concerning the diorama.

How to Use Objects, Specimens, and Models

Like other teaching aids, the use of objects, specimens, and models must be carefully planned. Casual observation of these items is not sufficient for effective instruction.

Complete utilization of these teaching aids requires maximum student handling and operation.

Objects, specimens, and models become even more potent in their effects when used with other teaching aids, such as pictures, maps, charts, graphs, diagrams, posters, manuals, work books, field trips, and projected material.



In order to facilitate the use of objects, specimens and models, they should be placed in boxes, carefully labeled, and stored in an easily accessible cabinet or closet in the classroom. Flat specimens that are mounted on cards may be placed in a vertical file. Be sure to note all materials in the visual-aids column in your lesson plans.

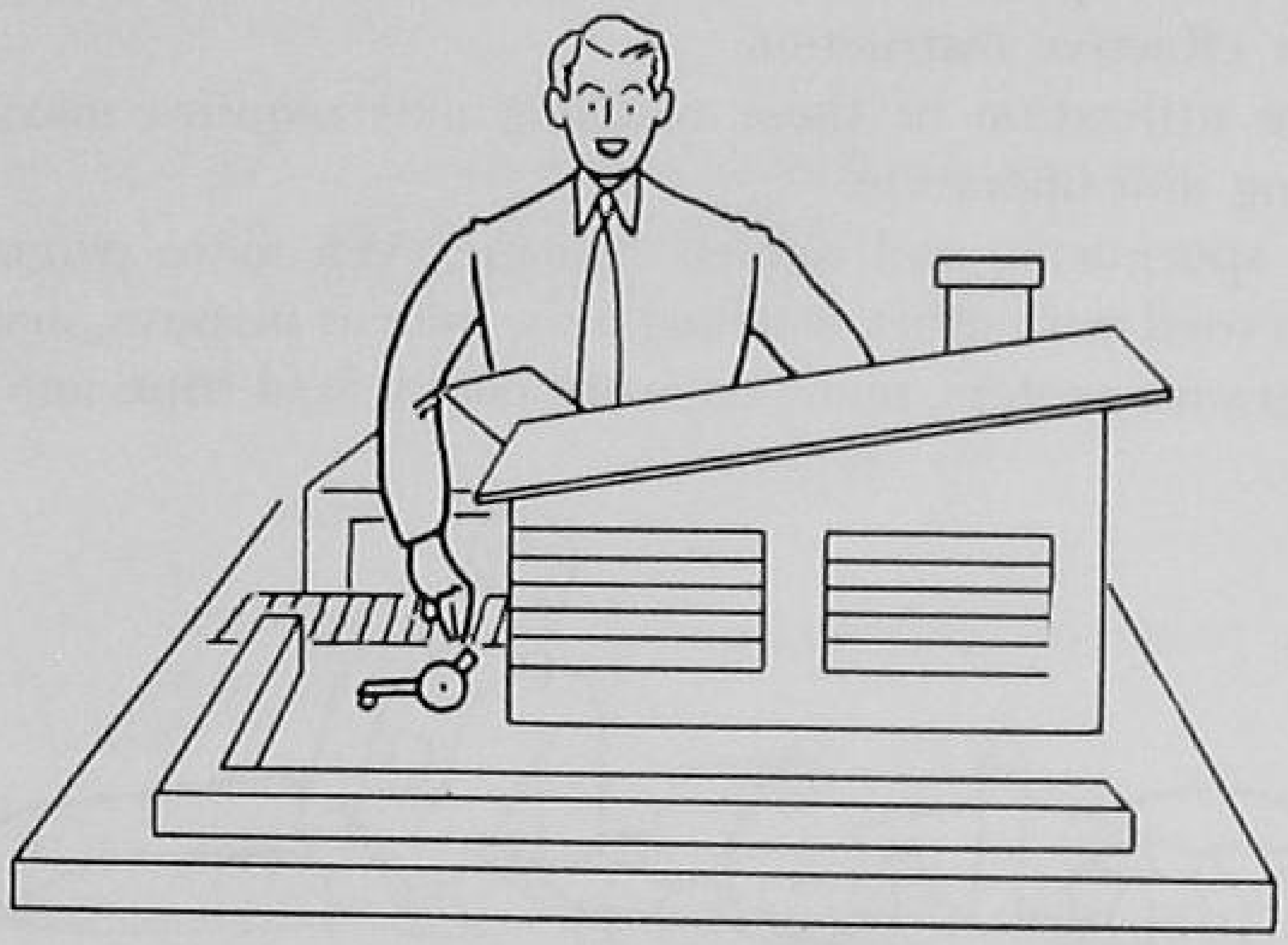
In general, these steps should be followed:

1. *Prepare student.* The experienced instructor will permit the student an initial period of exploration, but as soon as the lesson starts, the attention of the student must be directed to the specific points or steps.

The student should know (1) why the teaching aid is being used, (2) what specific points to observe, and (3) how this knowledge will benefit him. Informing the student that he will be tested at the completion of the lesson is an added stimulus for attracting attention and arousing interest.

2. *Present object, specimen, or model.* Present the teaching aid so that it is clearly visible to each pupil. Step by step point out each important item in a logical order. Demonstrate and clarify each point so that it is distinctly understood by the trainee. Accent principal steps and ideas. Remember, there is a limit to how much the learner can absorb at one time. It is more important to put one skill or idea across perfectly than several inadequately.

3. *Apply knowledge.* After the teaching aid has been presented, it should be applied or discussed as soon as possible. If the instruction



deals with a manipulative skill, the learner should be able to perform the job and explain each step. The instructor should also insist upon correct timing and the use of appropriate technical terms. Informational and attitude-type teaching should be thoroughly discussed to ensure student understanding.

4. *Test student.* The learner's application or discussion should be followed by a formal or informal test, which can be either oral or written. His performance and speed should be thoroughly checked and all errors should be detected.

5. *Review lesson.* All errors in performance, knowledge, and attitudes should be corrected immediately in a constructive manner. Do not hesitate to reshow the object, specimen, or model to clear up a point. If complete reteaching is needed—give it without delay. The most significant thing is whether the student can understand the instruction. Remember, *if the learner cannot perform, the instructor has not taught.*

DO's for the Use of Objects, Specimens, and Models

DO vitalize the lesson with objects, specimens, and models.
DO use the actual object whenever possible.
DO collect specimens and models from all available sources.

DO prepare specimen sets and models that will illustrate the lesson.
DO permit the student to construct models and develop his own specimen sets.
DO prepare the student before presenting the object, specimen, or model.
DO make the objects, specimens, and models appeal to as many of the five physical senses as possible.
DO demonstrate all objects so that they are clearly visible.
DO use a spotlight or desk lamp to illuminate the teaching aid.
DO speak up to the student and not down to the teaching aid.
DO demonstrate one aid at a time.
DO complete the demonstration before permitting the student to handle or manipulate the teaching aid.
DO use pictures, diagrams, and other teaching aids to illustrate the equipment in actual use.
DO avoid misconceptions by discussion or application at the end of a demonstration.
DO test the student's understanding of the exercise.
DO repeat the demonstration until the student thoroughly understands it.
DO carefully store objects, specimens, and models in adequate containers.
DO catalogue and file each teaching aid for easy reference.

QUESTIONS

1. What are objects? Specimens? Models?
2. What are the chief advantages of these devices?
3. What are the sources for obtaining objects? Specimens? Models?
4. How should objects be prepared for instructional use?
5. How should specimens be prepared for instructional use?
6. How should specimens be mounted?
7. What are "solid models"? "X-ray models"? "Working models"?
8. What materials are used for making models?
9. What are sand tables? For what instructional purposes are they useful?
10. What instructional steps should be followed when presenting objects, specimens and models in a learning situation?

PROBLEMS AND PROJECTS

1. Prepare a list of community sources for objects, specimens and models that may be used for instructional purposes.
2. Bring all possible objects, specimens and models to class. Canvass all sources mentioned in the text for materials. Be prepared to (a) evaluate your materials; (b) present them to the class according to the steps suggested in the text.
3. Prepare a specimen or specimens for instructional use. Follow the ten steps suggested in the text and be ready to explain each of the steps you follow.
4. If feasible and desirable, prepare a sand table for instructional purposes. Give careful attention to such features as construction materials, terrain, buildings, forests, fields, water, and equipment.

Courtesy of International Harvester Co.

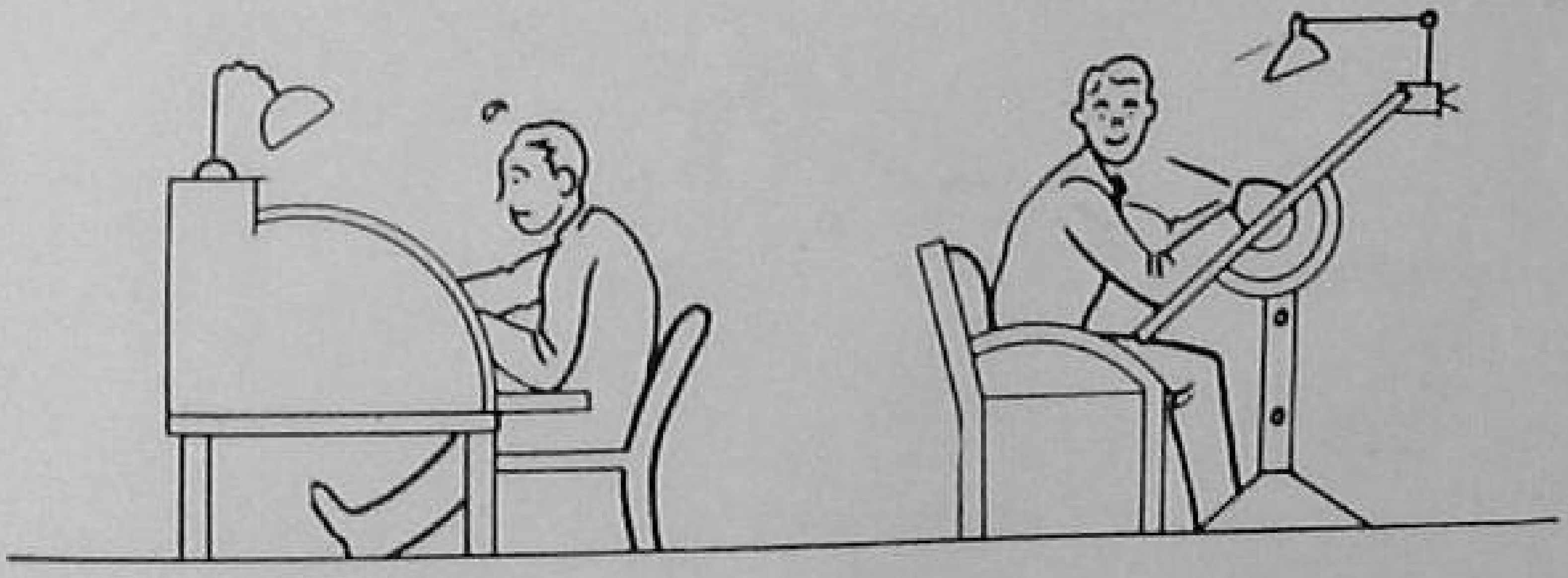
A practical training laboratory providing individual attention.

11

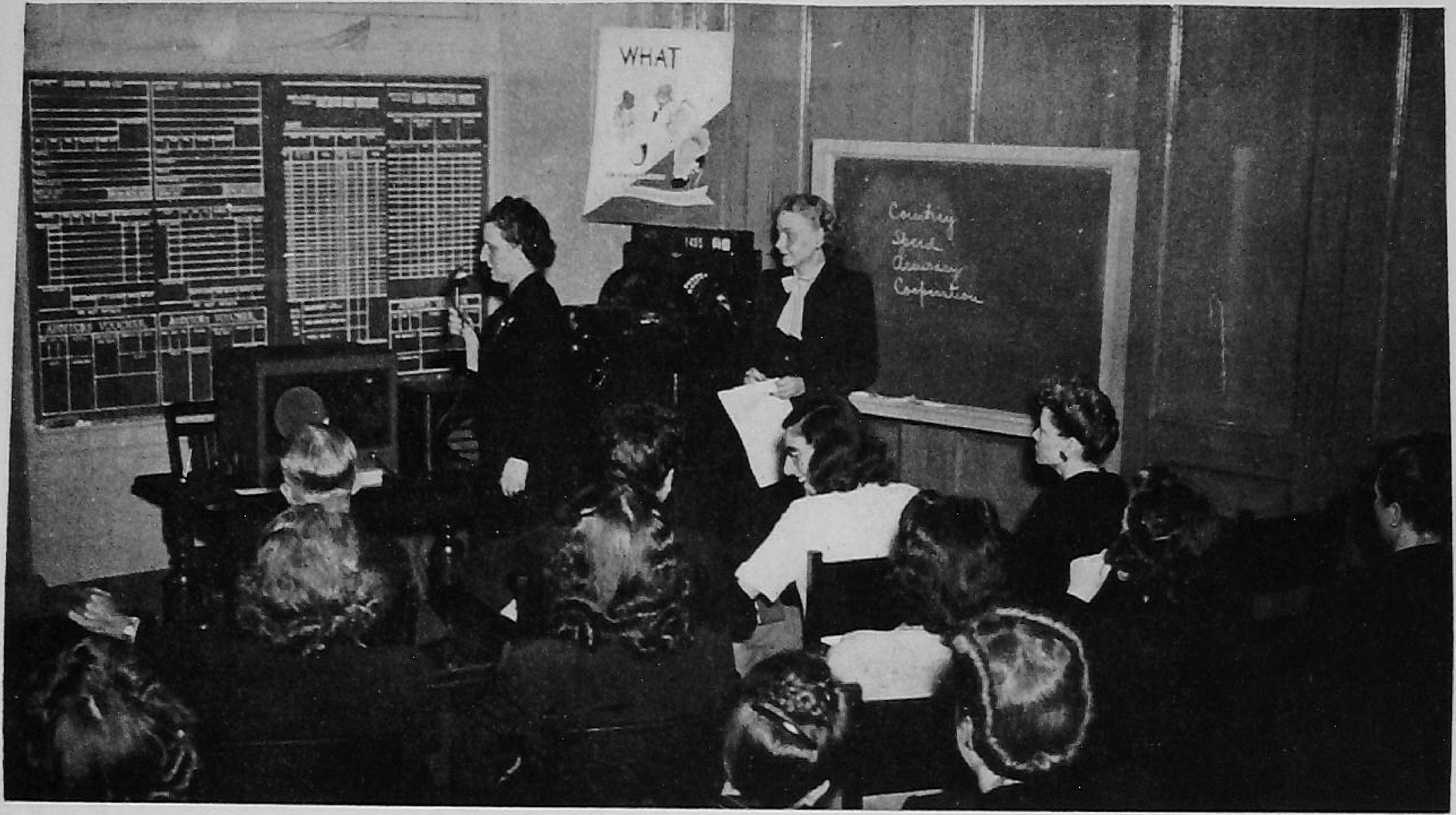
Audio-Visual Laboratory

"You don't need to print no letters for me; I kin read writin'!" was the way many business men reacted to the typewriter in 1880. Fortunately, few instructors feel this way about equipping a class room so that it can operate on a functional basis.

Effective instruction with audio-visual aids is extremely difficult in a room equipped, for example, with the old, permanent, flat-topped desks. Most students lack the necessary sense perceptions and "know-how," which can only be developed by specific instruction with actual equipment in a genuine learning atmosphere.



In order to attain the objectives and standards of performance that most instructors establish, students must have an opportunity to acquire dexterity and experience through the medium of audio-visual materials in order to assimilate, apply and practice the things he is being taught.



Courtesy of Joseph Horne Co., Pittsburgh

A "playback" machine for voice development.

An ideal learning situation would provide all the necessary equipment used in the particular subject in which the individuals are to be instructed.

Sample Laboratory Check List

The following list of physical equipment and supplies represents items suggested for an audio-visual and instruction laboratory. Additional items may be supplied by the resourceful instructor—items that would supplement his instruction in specific subject matter area.

FURNITURE

Filing Cabinets
Shelves
Counters
Display Cases
Desks
Work Tables
Movable Chairs
Clock
Waste Baskets
Mirrors
Magazine Racks
Extension Telephone
Show Windows
Display Windows
Floor Displays
Bookcases
Supply Case

EQUIPMENT

Blackboards
Bulletin Boards
Opaque Projectors
Sound Slidefilm Projector
Slide Projectors
Filmstrip Projector
Motion Picture Projector
Models
Exhibits
Actual Merchandise
Posters
Charts
Tape or Wire Recorder

REFERENCE MATERIALS

Related Magazines
Manufacturers' Manuals
Manufacturers' Samples
Manufacturers' Displays
Library Reference Books
Trade Magazines
Fashion Magazines
Mail Order Catalogues
Dictionary
Audio-visual Catalogues and Listings

SUPPLIES

Wrapping Paper
Twine
Bags
Tape (Gummed)
Folders and Guides
Workbooks
Charts
Drawing Ink
Speed Ball-point Pen
Show Card Paper
Lettering Brushes and Paints
Maps
City Directory
Telephone Directory
Miscellaneous Catalogues
Pickglasses
Scotch Tape
Thumbtacks

For instruction in a specific subject, appropriate instructional materials should be added. For example, the instructor of a retail store training class might want to add the following:

LAYOUT AND EQUIPMENT

Receiving Space	Change Drawer or Cash Register
Marking Table	Marking Machine
Stock Space	Wrapping Paper Roller
Shelving	Cord Holder
Counter	Tape Receptacle
Show Case	Bag Container
Store Window	Box Container

FIXTURES

Card Holders	Dress Stands
Ticket Holders	Hose Displayers
Counter Top Equipment	Belt Racks
Tee Stands	Hat Stands
Display Stands	Shoe Stands
Garment Racks	Mannequin
Window Stands	Head Form

TOOLS

Hammer	Staple Machine
Screw Driver	Scissors
Pliers	Glass Cutter
Small Saw	

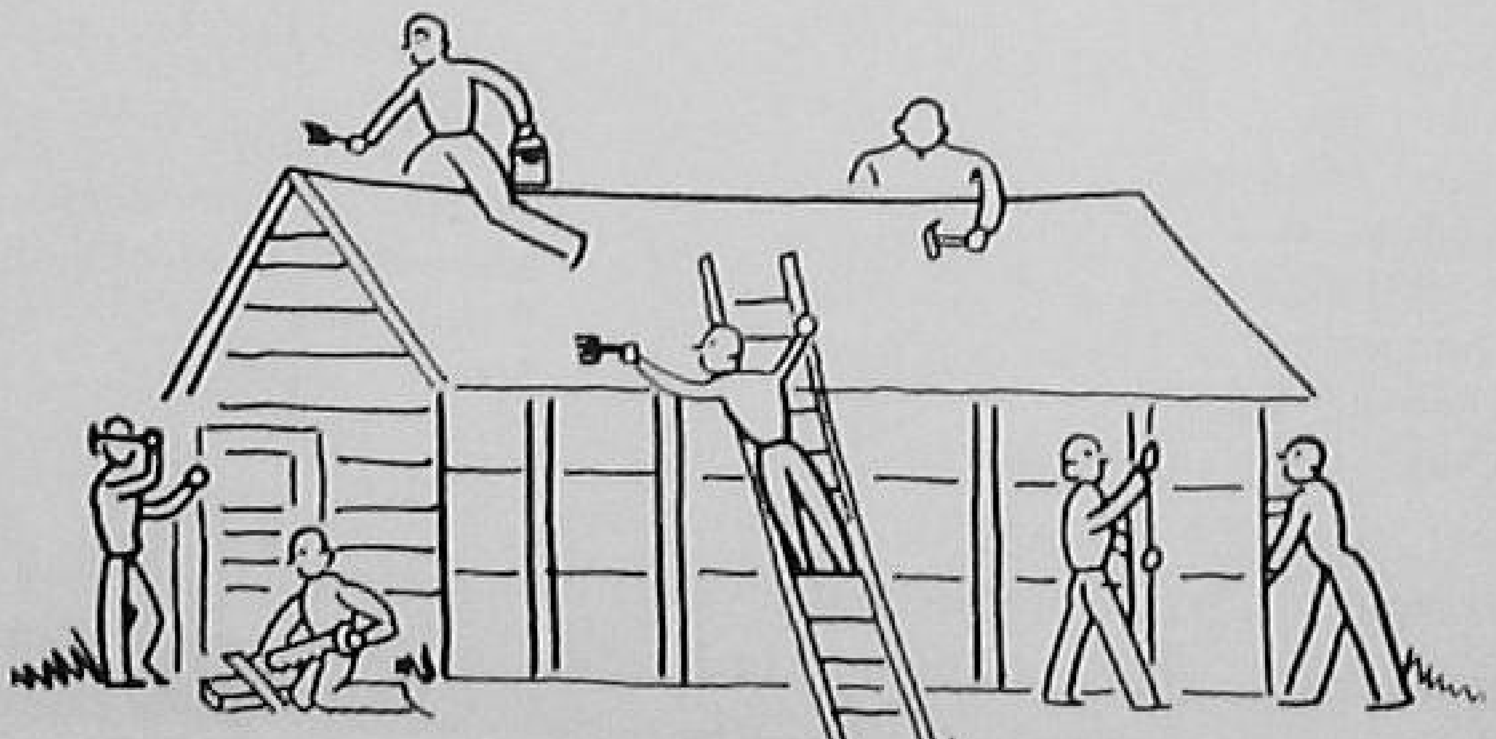
SUPPLIES

Nails	Glass
Screws	Wood Moulding
Tacks	Marking Crayon
Crepe Paper	Scotch Tape

This list is merely suggested. Each subject will probably require different materials and supplies. In addition to blackboard, bulletin board, and facilities for using audio-visual aids, the laboratory should also meet the following conditions: (1) Suitable location; (2) Proper heating; (3) Sufficient lighting; (4) Adequate ventilation; (5) Six square feet work space at tables.

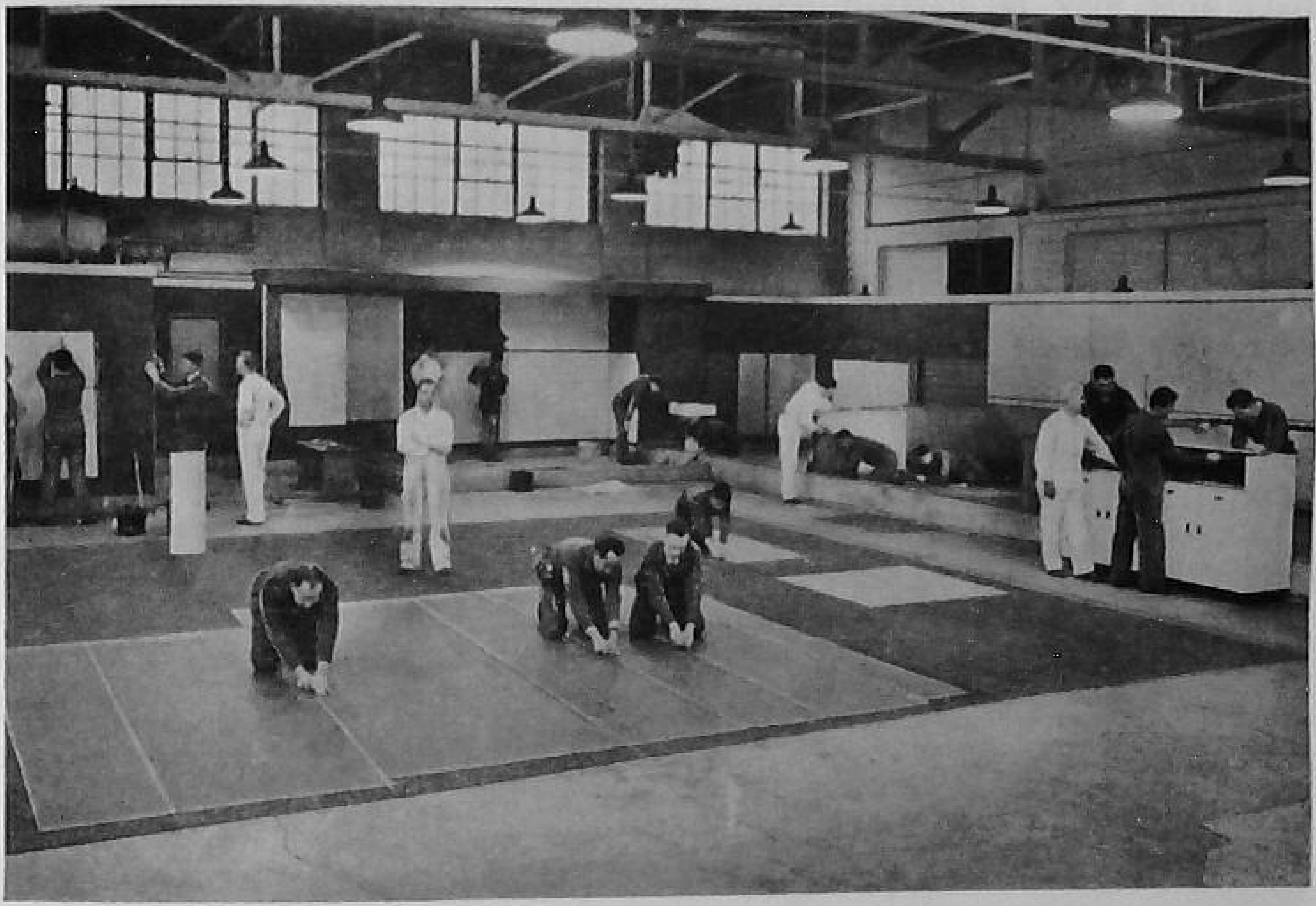
Sources of Laboratory Equipment

The equipment for the laboratory may be (1) prepared by the instructor and student, (2) contributed by local agencies, or (3) purchased.



Instructor-student-made equipment. In many cases, the initial high cost of new equipment will prevent its outright purchase. However, many instructional laboratories can be set up for the price of a can of paint.

Whenever possible or practical the students should be permitted to participate in the planning, construction, finishing, and setting up of equipment for their respective kinds of education. The instructors and students in the practical arts and manual training departments of schools



Courtesy of Congoleum-Nairn, Inc.

A good training laboratory should provide ample working space.

are very helpful in constructing the necessary equipment—likewise, the co-operation of adults in religious, social, and civic organizations should be encouraged.

Equipment from local agencies. The majority of local agencies are extremely co-operative and are willing as far as they can to contribute equipment for a school laboratory. In some cases, the equipment and supplies will require slight repairs. However, selected equipment can be easily adapted for the laboratory in practically any area of education.

Purchased equipment. Experienced architects and contractors can design and build the ideal audio-visual laboratory. Equipment companies can offer suggestions of value. Various trade associations and audio-visual dealers, as well as advisory committees of local industrialists and merchants, can often suggest the best sources for this equipment.

How to Prepare Laboratory Equipment

The specific units required for each laboratory will depend upon the actual educational needs and the physical characteristics of the class room or laboratory. The placement and layout of equipment and accessories will largely be determined by wall space, position of windows and doors, and the physical dimensions of the room.

If funds for outright purchase are lacking, canvass the merchants, industrialists, and other sources in your community to discover what they have that may be used in your laboratory. Discarded fixtures, files, counters, machinery, and other equipment may be renovated. Encourage the students or group members to help prepare the equipment. Other necessary units should be built from scratch.

Courtesy of John Hancock Mutual Life Insurance Co.

Executive training in an appropriately equipped conference room.

For example, the following simple directions can be used in constructing a demonstration surface from an ordinary table:

1. Secure a discarded long table.
2. Reinforce legs and other joints.
3. Cover front and both sides with wide corrugated paper. (Use stapling machine to attach paper.)
4. Cover table top with oilcloth, heavy paper, or glass.
5. Secure glass, corners, splicers, screws, price signs, and merchandise

from the local variety stores. (Use glass cutter for cutting glass to proper size.)

Store window. In the area of retailing, for example, it is easy to see how a show window may be constructed at little cost. This display need not be elaborate. It may consist of a simple platform and a background made of masonite or wallboard. The glass may be omitted to permit ease in teaching. However, if this is done, instruction should also be given in a glass-covered window to develop a complete technique.

Masonite and wallboard instead of lumber may be used successfully in preparing demonstration benches, display racks, bins, and other educational objects in the laboratory. This type of material is easier to handle and is less expensive than lumber. A wooden frame will increase the sturdiness of the unit. In fact, heavy corrugated paper or large sheets of cardboard may be used satisfactorily with a strong wooden frame.

Bridging the Gap [1]

Bridging the gap between school and job, between theory and practice, is undoubtedly facilitated when the instruction room has an atmosphere of reality closely approaching that of practical usage. Also, students attain a learning attitude difficult to obtain at the traditional classroom desk. That special equipment does help with training can be attested by everyone connected with education for both high school and adult learners.

Something is added when school and life are brought into harmony through the use of devices, tools, and audio-visual aids. Through the experiences of past years it is possible to assess the value of specially equipped laboratory room. Such rooms have made it possible to:

1. Create and maintain an atmosphere of realism.
2. Help students to realize that their school opportunities are worthy of their best efforts.
3. Give students facilities for gaining the social abilities necessary for making satisfactory life adjustments.
4. Create and maintain greater student interest and help secure better selection of students each year.
5. Facilitate learning by allowing students to apply and practice what they have been taught.
6. Develop a professional attitude toward the subject they are studying.

[1] Detailed drawings, lists of materials and descriptions of school laboratories may be found in *The American Business Education Yearbook*, Vol. V, 1948, New York University Bookstore.

A high-school laboratory.

7. Enable the students to engage in project and laboratory work in the fields of their choice.

8. Give valuable aid and guidance to nonvocational and pre-employment groups.

9. Use realistic equipment to teach faithfully all phases of life.

10. Help students to be self-respecting, self-sustaining, economically intelligent citizens.

The class laboratory. Because much student activity should be on an individual project or supervised-study basis, the laboratory should be located where there is a minimum of noise. Certain subjects, however, may require a location on a corridor, or other place where traffic is not undesirable.

Because good education should be individualized, more square feet of working space are desirable than are required for instruction on an ordinary group basis. Standard classrooms for general education usually need a minimum of 16 square feet of floor space to an individual. A laboratory should have 25 to 35 square feet of floor space for each learner to provide adequate working space and to permit ample space for systematically arranging and keeping the necessary instructional material and equipment.

The development of students, both youth and adults, will be most effective when the physical equipment is as complete as possible. Physical equipment needed for a special training room must include tables and chairs—not desks and rigid seats. The work tables should be light and portable so that students may use them in any part of the room or in any grouping. Each table should have a drawer. The chairs should be comfortable and sturdy.[2]

At the front of the room a long table or desk should be placed for the teacher. The table should be long enough to seat panels of students for group discussions or the dramatization of projects and demonstrations. A blackboard should extend across the front of the room above the table. The front of the room, at the right, is the place for a bulletin board about 4 × 6 feet, which may either stand open or fold into the corner. This bulletin board may be used for displaying a large variety of pictorial or other visual aids, as well as current materials to which students need to refer frequently.

Files should be placed at convenient locations. Sufficient room should be provided for all types of leaflets, magazines, and bulletin material. Each student might be allotted a section of a file, and this file should be periodically checked for neatness. A mirror may be placed on the wall. At an accessible place in the room there may be a display

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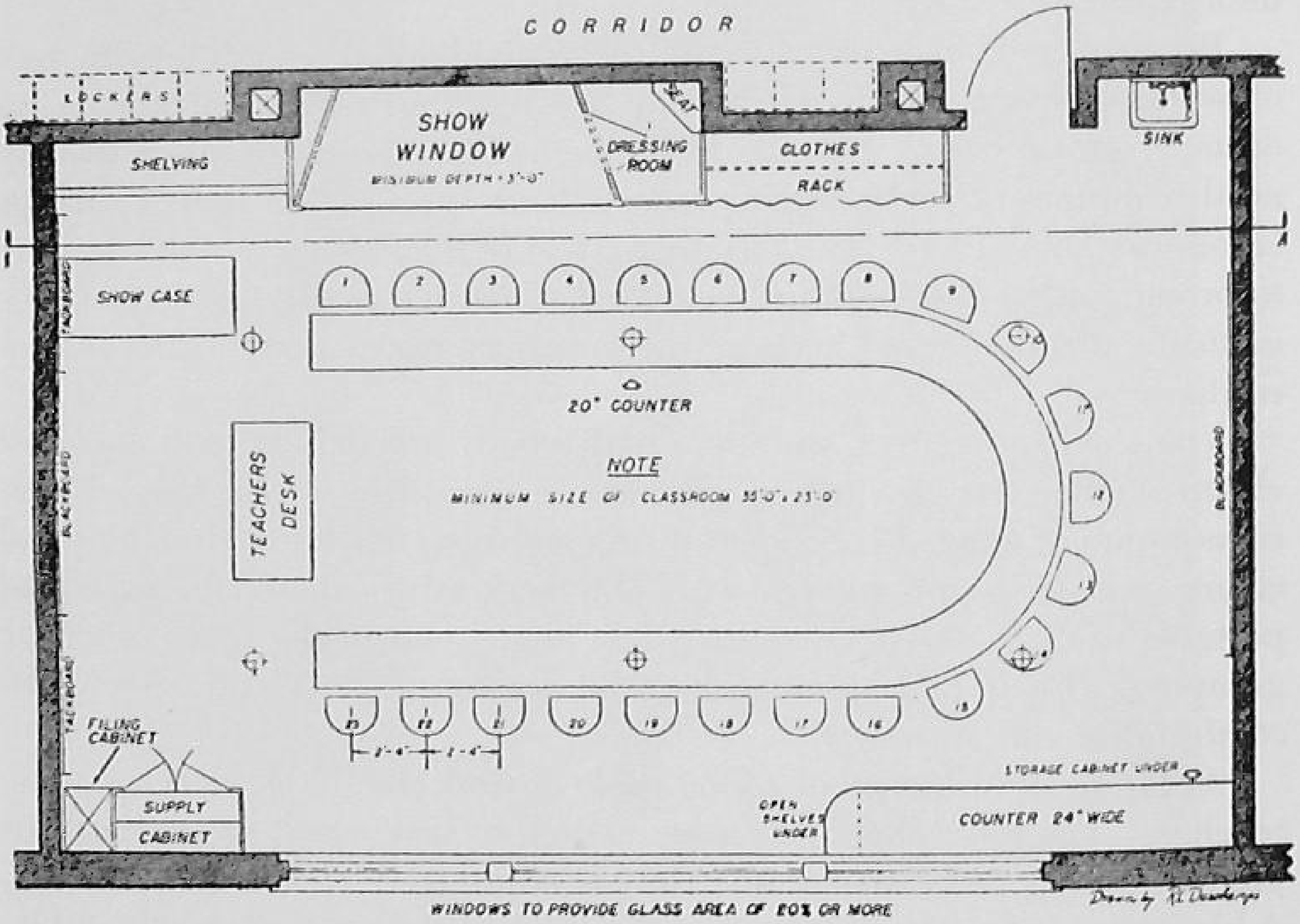
[2] Haas, K. B., *How to Coordinate School Work Programs*, The Gregg Publishing Co., New York, N. Y.

table. A series of bookshelves should be available for storing a collection of current printed materials.

One side of the room should have a special conference or work table, large enough to seat eight or ten students.

In one corner of the room there may be storage space for many items. This room should have the special equipment needed by the instructor in teaching his particular subject.

Floor plans and layouts. Floor plan No. 1 was furnished by John A. Beaumont, State Supervisor, Illinois. This floor plan presents an ideal layout in use in Springfield, Illinois, since 1940. It is a distinct advance over the usual school room layout and equipment.



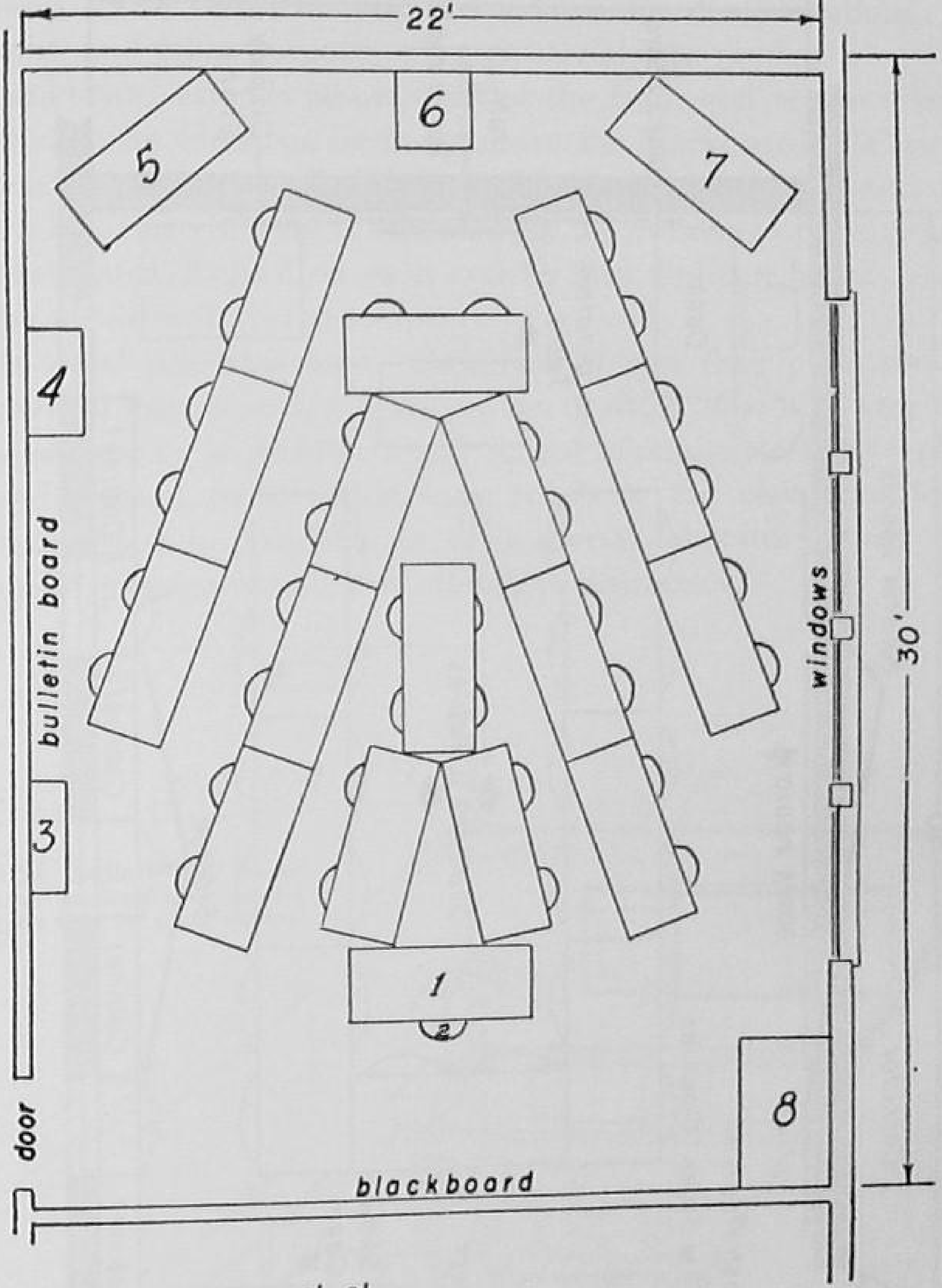
PLAN · OF ROOM · SCALE-3/8"=1'-0"

Floor plan No. 1.

Floor plan No. 2 was furnished by C. Kemp Hoff, teacher-trainer, New York. It shows an unusual floor plan that has possibilities for many conditions.

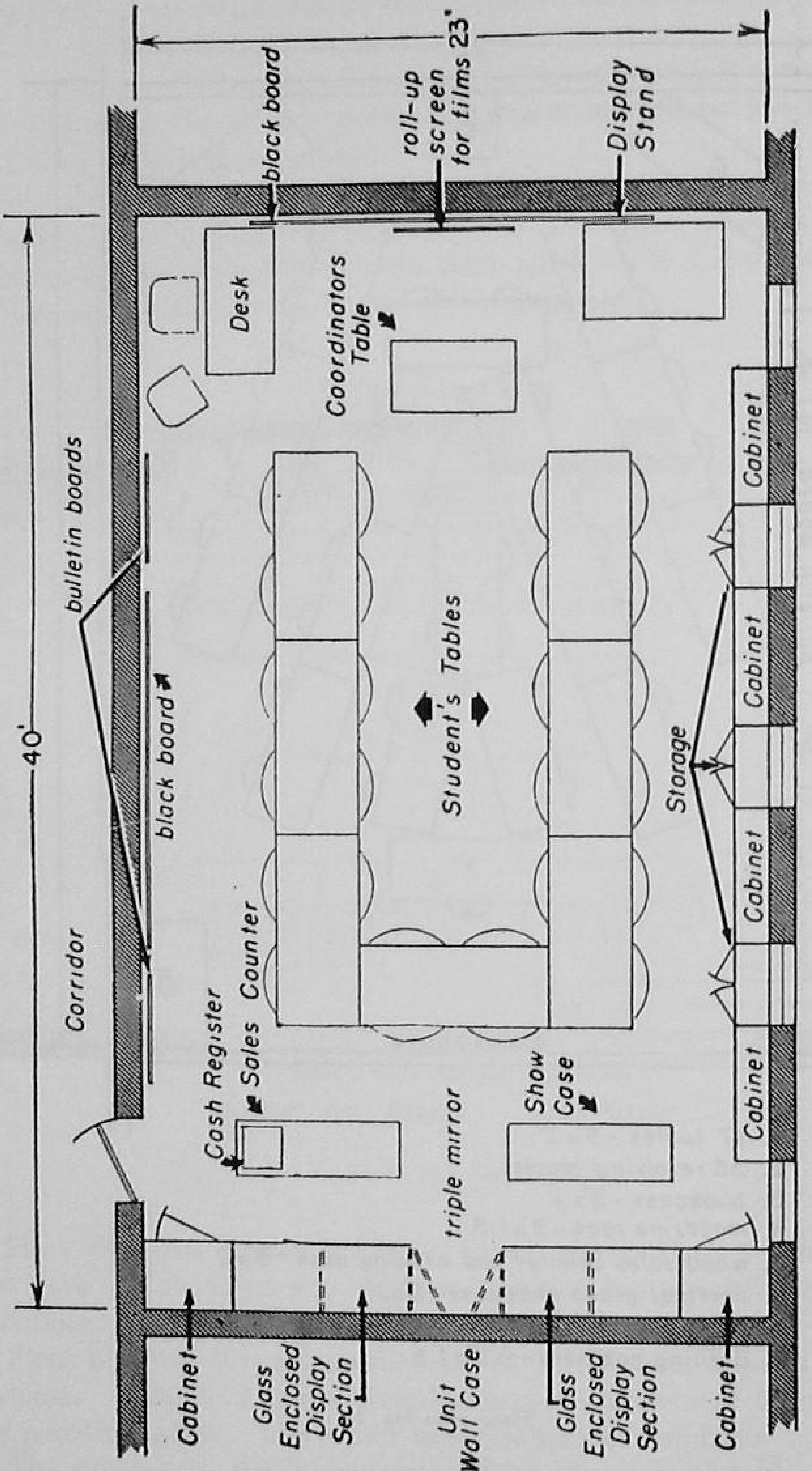
Floor plan No. 3 was furnished by T. Carl Brown, Supervisor, North Carolina. It shows a rather complete room arrangement for a cooperative part-time class. The layout deserves special emphasis.

The students in this laboratory work at library type tables placed in a *horseshoe* design. This permits the best use of conference and demonstration methods of teaching, as well as ample working space for the



1. 17 tables - 5'x 2'
2. 35 revolving stools
3. bookcase - 3'x 1'
4. magazine rack – 3'x 1.5
5. wood sales counter and wraping desk – 5'x 2
6. vertical glass showcase - 2'x2'
7. horizontal glass display case - 5'x 2'
8. 3 filing cabinets – 2.5'x 1.3

Floor plan No. 2.



Floor plan No. 3.

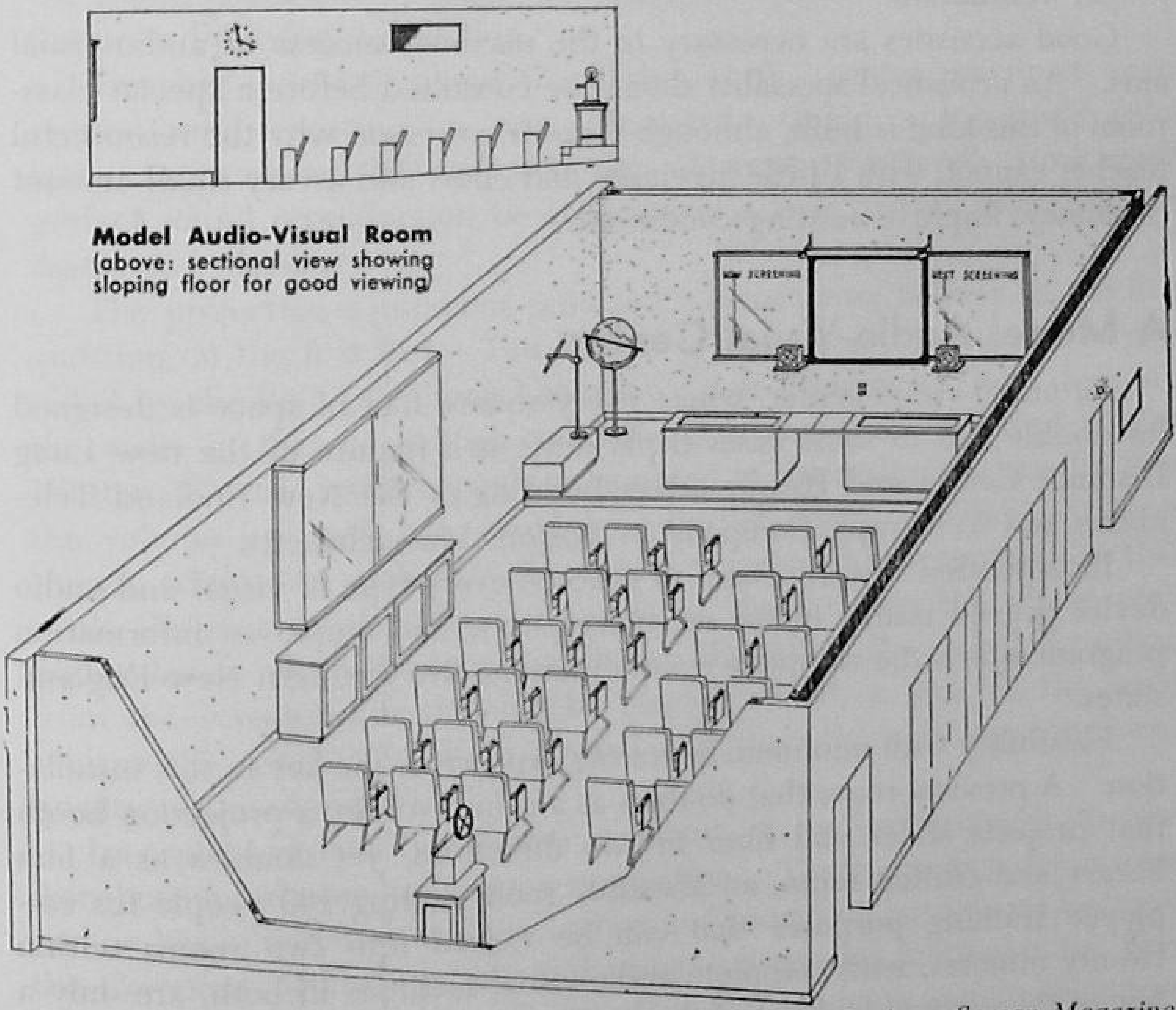
student. In addition, the seating can be easily adjusted for the use of audio-visual aids.

The instructor's desk is placed in one corner for use in individual counselling. The instructor also has a table for demonstrations, panel discussions, and other purposes where materials are needed.

A blackboard extends across most of the front end of the room. A roll-up screen for films can be hung above the blackboard. When films are shown, the screen is pulled down and with the projector placed on the student table, full visibility is obtained for all members of the group.

A blackboard, flanked on each end by cork bulletin boards, extends along the inside wall of the room.

Audio-visual aids laboratory. Hundreds of new floor plans similar to that shown in floor plan No. 4 are on the drafting boards.[3] One of the primary objectives of architects and school administrators is to plan to place audio-visual tools within easy reach of the classroom teacher. These tools must be available in each special laboratory room with a minimum of physical detail and attendant distraction.



Courtesy Business Screen Magazine

Floor plan No. 4.

[3] "Facilities for Audio-Visual Equipment," *See and Hear*, December 1946, pages 21, 22.

Every specially equipped room should have equipment and furnishing for audio-visual instruction. A darkened room is fundamental for viewing films and opaque projections. Flame-proofed drapes are the most widely accessible and useful darkening material, but shades and other darkening devices may serve equally well.

Electrical facilities are very important. They should include double universal-service outlets to deliver 15 to 20 amperes and 120 volts at the front and back of the room. A conduit should be provided in the wall or floor for a speaker cable to the projector at the rear.

A permanently mounted roll-type screen may be installed on brackets above and clearing the chalk trough. To reduce eyestrain, prismatic chalk trough-lighting units may be turned on during the showing to light the surrounding wall area to a brightness value approximately one-tenth of the screen itself; such illumination eliminates uncomfortable lighting contrast.

Drapes should be mounted to provide free circulation of air above and below. An exhaust fan or an air conditioning unit will also provide proper ventilation.

Good acoustics are necessary to the maximal success of audio-visual aids. An acoustical specialist should be consulted before a special classroom of this kind is built, although there is no reason why the resourceful teacher cannot, with a little ingenuity and effort and a very small amount of money, improve existing conditions.

A Model Audio-Visual Center

An audio-visual center, where every square foot of space is designed for double and in some cases triple duty, is a feature of the new Long Distance Center and Headquarters Building of the New England Telephone and Telegraph Company in Boston, Massachusetts.

Incorporated in a minimum of space is every type of visual and audio device proved usable in the extensive public and employee information program which the company conducts in the five northern New England states.

Flexibility with minimum operating expense, is the key to this installation. A preview room that doubles as a sound studio, a projection booth that projects slides and films in two directions, yet doubles as a film library and editing room, an assembly room seating 189 people for employee training purposes that can be turned into two rooms within twenty minutes, with complete audio-visual facilities in both, are only a few of the unusual features of this audio-visual center.

Like so many of the new developments in the audio-visual field, this unusual center was born of necessity. A training film program for 35,000

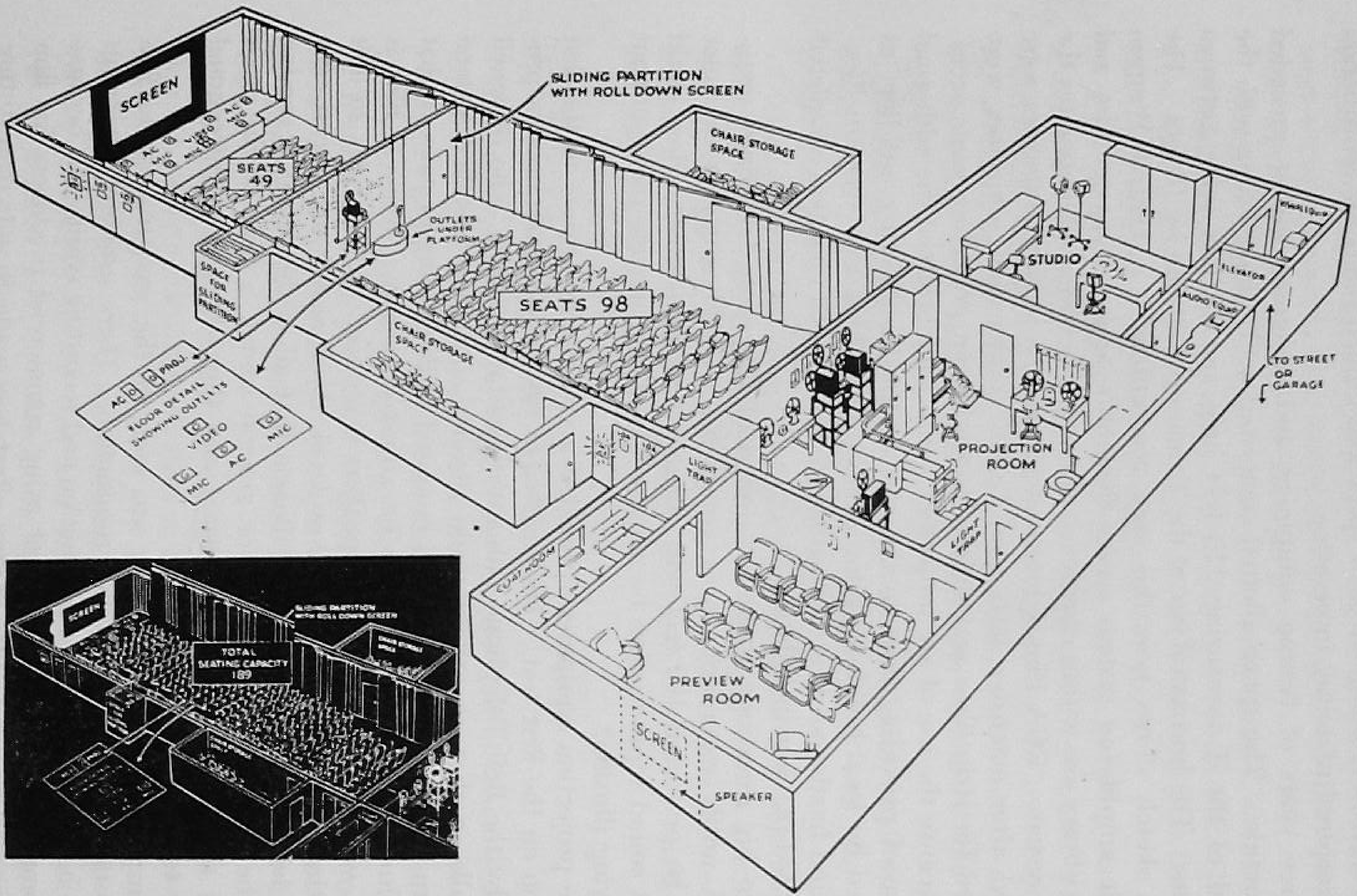
employees in five states, and an extensive system of informational film distribution to the public, necessitated adequate headquarters facilities. However, closely budgeted floor space and limited funds for construction made inspired planning imperative.

Three years of testing equipment and designing layout preceded construction. The space allotted comprised a "T" shaped area with the vertical of the T measuring 110 feet long and 18 feet wide between columns. The horizontal bar of the T measured 30 feet by 18 feet. The artist's sketch shows how this area was utilized. A central Western Electric amplifying system serves the entire area. A master film and record library are within easy reach of one projectionist who operates the entire system. RCA 16mm. incandescent motion picture projectors were selected after extensive tests, and GoldE combination projectors were installed for strip films and slides. Incandescent projectors were necessary because the use of arc projectors would have involved the additional expense of providing flues to the roof of the twenty-story building, as required by local building codes. Presto turntables with Western Electric sound heads and Webster automatic three-speed changers completed the record-playing installation.

Two big questions about the design of this center remained unanswered until construction was completed. Could a top-grade color image be projected 100 feet with incandescent projectors? How could perfect sound reproduction be achieved in a long narrow room without destroying illusion?

The projection equipment provided a satisfactory answer to the first question on the first test. The answer to the second question was provided by the Bell Telephone Laboratory sound engineers, who designed the walls so that no echoes could develop and then specified sixteen Western Electric baffled speakers mounted in the ceiling in pairs so that the volume for each pair could be adjusted readily. When a film is shown, volume on each pair of speakers is reduced progressively so that while the rear speakers have a low level, those nearer the screen emit higher levels which produce the illusion that all of the sound is coming from the screen. For dancing or general sound, a flick of the wrist returns the speaker levels to normal and then there is no directional quality to the sound at all.

Incorporated into this center are most of the modern aids to film distribution, editing and minor production. There are few trimmings and no heavy investment in production and recording equipment because the Company makes a practice of using commercial producers for film and recorded training aids. Every effort was made to anticipate future requirements in the audio field. Shielded wires in conduit lead to loud speakers in cafeterias and employee lounges for music and speech dis-



Courtesy of New England Telephone & Telegraph Company

Artist's sketch of the New England Telephone & Telegraph Company's new audio-visual center shows compact arrangement and complete facilities for many types of meetings and presentations. The inset diagram shows main assembly room area with sliding partition removed to provide seating capacity for 189 persons.

tribution if desired. Coaxial cables are in place with wall and floor outlets for television viewers when this medium comes into general use. Convenient outlets for mikes, AC current, and television are provided in booth, assembly rooms and preview room.

But even to the uninitiated, a tour of the center would reveal unusual features not yet in general use in the industrial field. When anyone enters any of the three doors to the center, an illuminated "IN USE" sign, controlled from the booth, warns the visitor if a show is in progress. In the assembly rooms, guests are delighted with the comfortable chairs, which utilize an unusual interlocking feature to assure rigidity but can be moved quickly to other locations. These chairs are designed to supply the same degree of sound absorption empty or full. The entire area is air-conditioned for year-round comfort and is lighted by instantaneous fluorescent tubes on the ceiling and in coves on the side walls.

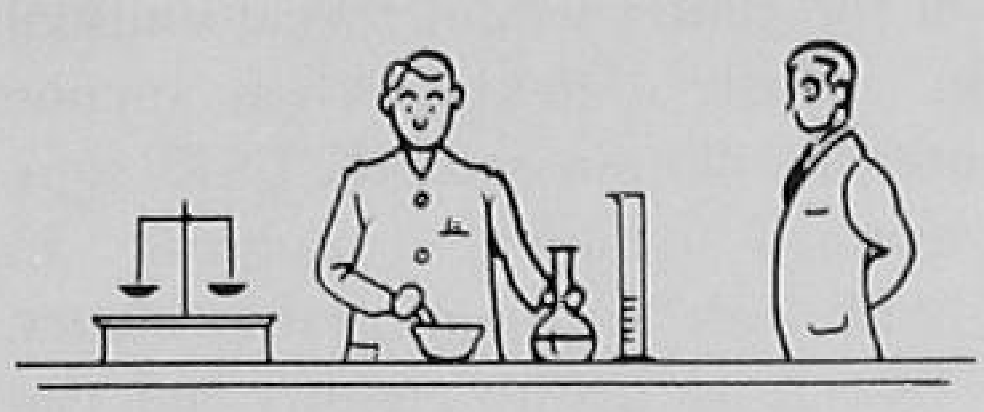
The projection and editing booth incorporates several novel features to conserve space and improve efficiency. Constructing the booth on two levels permitted projection above the heads of the audience, provided additional storage space under the platform, separated the projection and editing sections, and placed projectors, turntables, radio, and film libraries within easy reach of the operator. A bank of three Western Electric amplifiers provides any desired combination of sound systems. To a visitor, the amplifier panels seem complicated. However, use of the numerous switches and knobs that provide the essential flexibility of the system has been simplified by numbering knobs and developing a chart which permits quick easy settings for over two hundred combinations. Monitoring from either amplifiers or speakers separately is provided, while a separate Teletalk system provides monitoring for cues and announcements in all three rooms. The booth measures only 18 by 18 feet, yet contains all necessary equipment for efficient editing and projection.

The New England Telephone and Telegraph Company, with the other Bell Companies, has pioneered in the use of industrial films for public information. It has been showing industrial films since the early twenties. Since the end of the war, while the public information side of the job has continued, extensive developmental work has been carried on in the field of employee information, job and attitude training by means of films. At the present time, over 300 films are in active use in the training library and over 100 informational film subjects are available to the public.

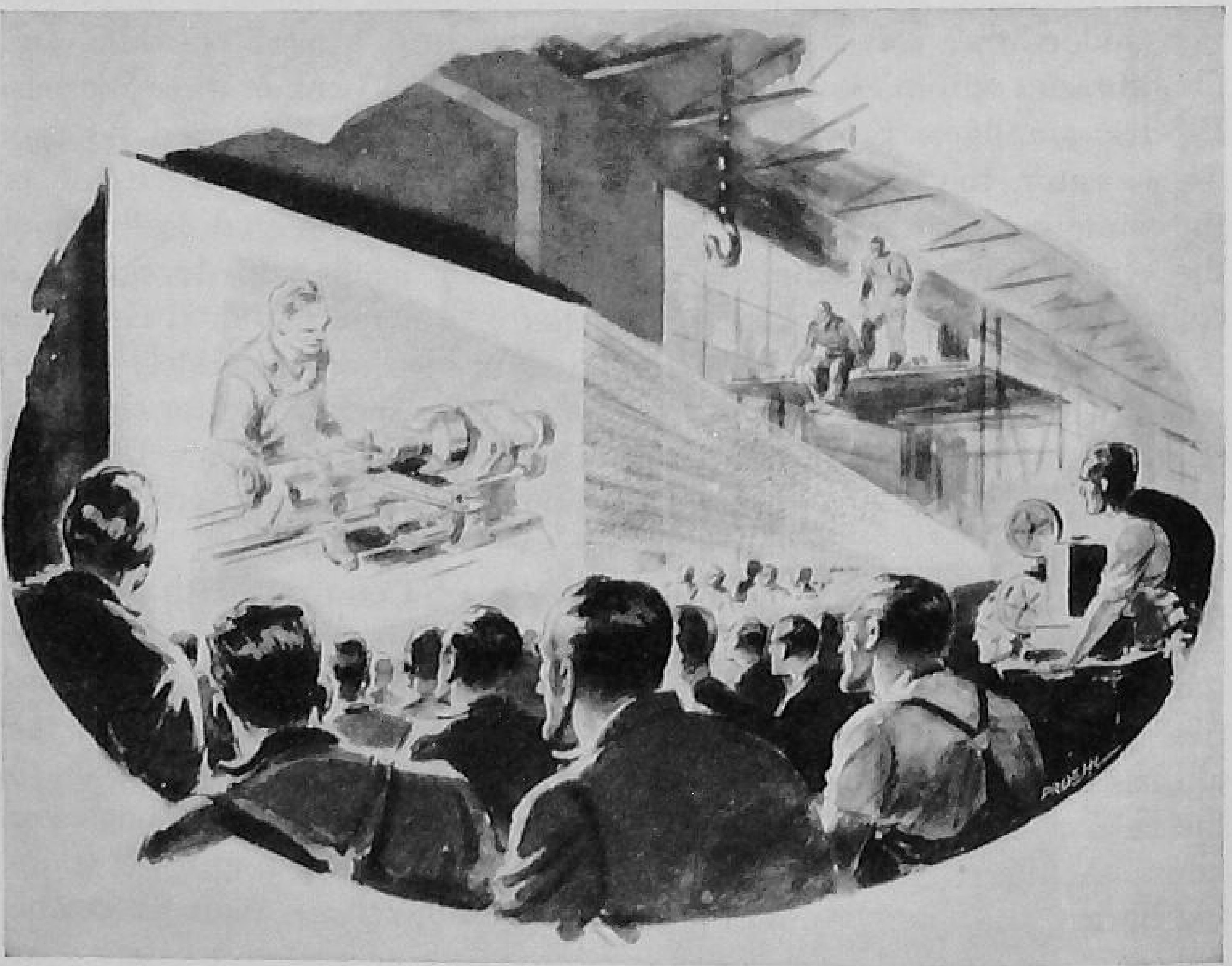
The Public Relations Department of the Company coordinates all audio-visual activities. The staff operating this section is extremely small for a film program that reaches an audience of nearly two million persons annually.

How to Use the Laboratory

The best-equipped classroom or laboratory is worthless unless it is properly utilized. Projects should be developed to provide an opportunity for the student to assimilate, practice, and acquire skill in his specific subject.



Before the student "tries his hand," the instructor should carefully explain or demonstrate the facts. After thorough clarification, the student should apply the knowledge and perform the task. The instructor should then constructively criticize the student's efforts and permit him to make the necessary changes to improve his abilities and accomplishment. A group discussion may be used to point out the student's weakness and to offer helpful suggestions.



Courtesy of South Bend Lathe Works

Using the actual plant for a motion picture presentation.

A work sheet might be prepared for each unit, and the student could be required to develop a satisfactory skill before completing it. The type

of project used in the laboratory will depend upon the specific needs of the students and the need for the instruction.

Student work sheet. The work sheet outlines and sets up the project to meet the specific needs of the student. The following simple work sheets are examples of some that have been used in one type of instruction.

Window display work sheet

1. Sketch layout plan
2. Clean window
3. Assemble and clean fixtures
4. Assemble display material
5. Assemble merchandise
6. Install display
7. Judge display
8. Return merchandise, fixtures, and display material

Food department work sheet

1. Remove all merchandise and price tags from shelf
2. Clean shelving
3. Dust merchandise
4. Set up merchandise
5. Insert price tags
6. Display "daily special" on counter
7. Prepare sign for daily special
8. Take complete inventory

Showcase work sheet

1. Sketch layout plan
2. Clean showcase
3. Assemble and clean fixtures
4. Prepare display equipment
5. Assemble merchandise
6. Insert material
7. Judge showcase
8. Remove merchandise, fixtures, and display equipment

Variety store counter work sheet

1. Break down complete counter
2. Wash all glass
3. Clean all fixtures
4. Clean counter top
5. Dust merchandise
6. Set up new ends and center display
7. Lay out remainder of counter
8. Take complete inventory
9. Discuss layout

How to Prepare an Operational Sheet[4]

In every occupation there are certain operations which are used in performing many jobs, such as centering stock for a lathe, making a

[4] See Chapter XII, *Personalized Audio-Visual Instruction*, for further details.

MIDDLESEX COUNTY VOCATIONAL SCHOOLS
Easton Avenue, New Brunswick, N.J.

Drill Grinding

Machine Shop Unit I — Operation Sheet No.17

Objective:
To grind or sharpen a drill for general purposes.

Preparatory Information:
For general purposes a drill is sharpened to an angle of 59° with a lip clearance of from 12° to 15°. (See figures I and II) If the drill is ground on a dry wheel, care should be taken to prevent the drill from getting hot. The drill should be dipped frequently in water. A high speed drill should be ground on a dry wheel and should not be dipped in water as such sudden cooling might crack the point.

Tools:
Emery wheel, drill gauge, drill to be sharpened.

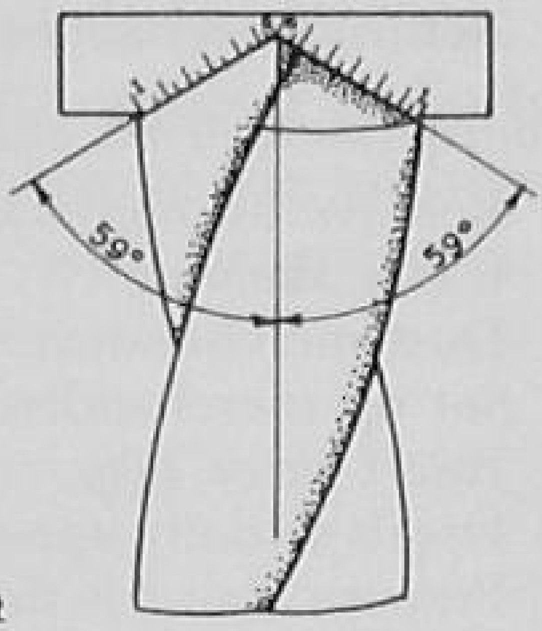


Figure I

Procedure:
(1) Put on your goggles.
(2) Hold drill in right hand about 3/4" from the point with the index finger and thumb, resting the hand on the steady rest.
(3) Grasp drill shank with left hand.
(4) Let point of drill come in contact with the face of the wheel in such a manner that the cutting edge is at right angles with the emery wheel.
(5) Press the drill against the wheel, lowering and raising the left hand and rolling the drill with the right index finger and thumb.
(6) Test the drill with the drill guage. (See Figure I)
(7) Repeat operations 4 and 5 until the required clearance angle and lip are obtained.
(8) Report to instructor to have your work checked.

Questions:
(1) Why should the point of the drill be kept cool while grinding it?
(2) Why should the drill be ground on a fine emery stone having a true surface?
(3) What safety precautions should be observed when grinding a drill?

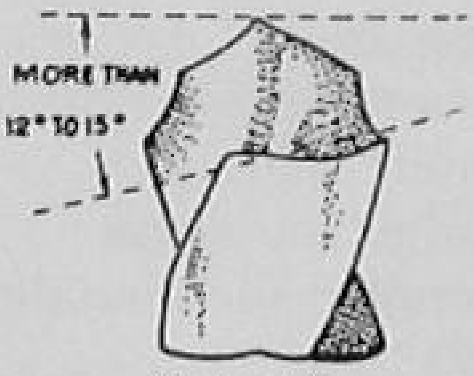


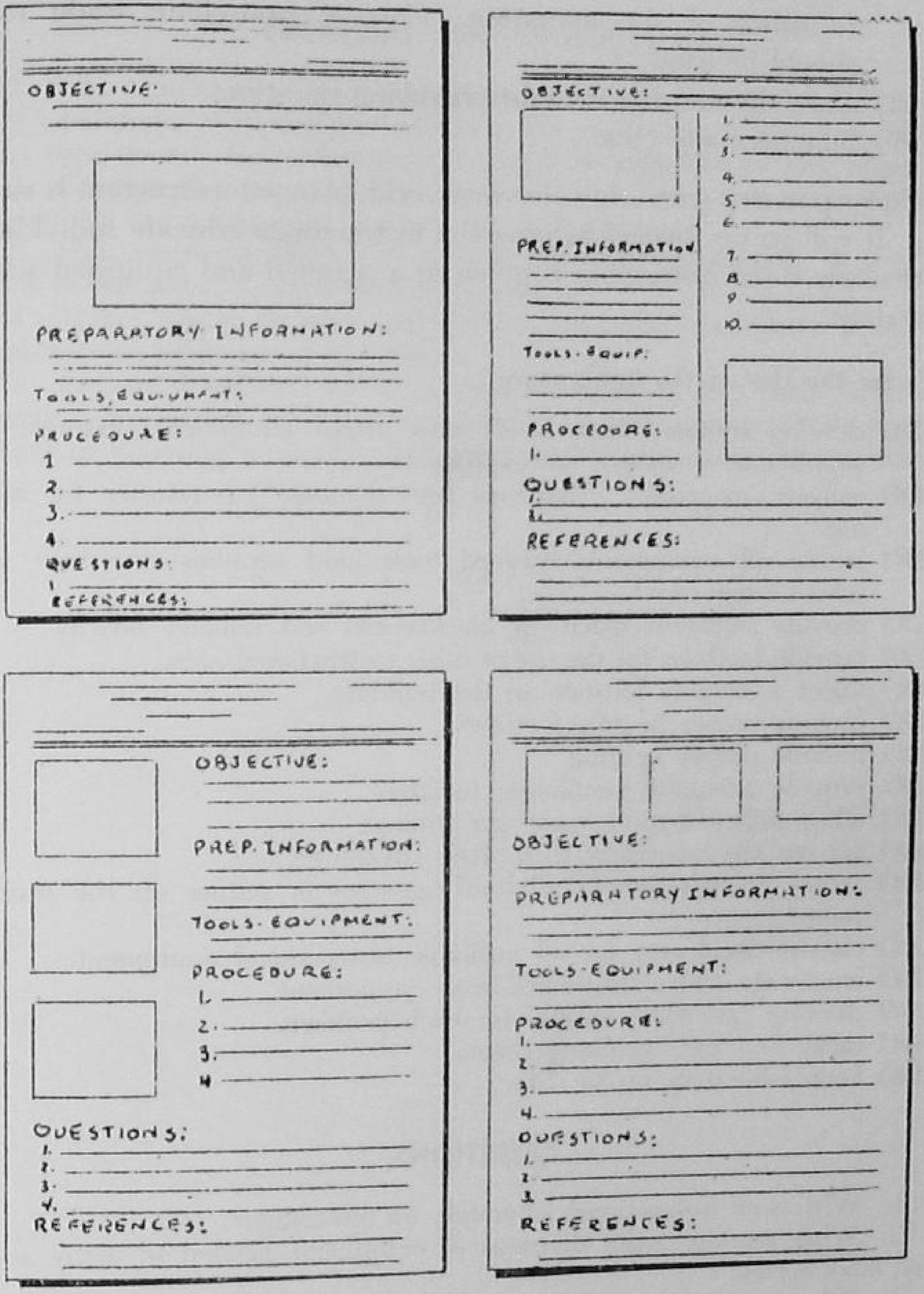
Figure II

References:
Handbook for Drillers, Cleveland Twist Drill Co., Cleveland, Ohio.- Pages 9-20, thirteenth edition, or Pages - 9-20, eleventh edition.
Shop Theory, Henry Ford Trade School, McGraw-Hill Book Co., Inc. - Pages 71-75, Revised Edition.

An operation sheet.

French seam, setting a composing stick to measure, tinning a soldering iron, and inking a drawing pen.

An operation or planning sheet gives in sequential order the steps required to perform an often-recurring fundamental step in procedure. The operation or planning sheet saves time and is efficient because it enables the instructor to write out, once, often-recurring operations for use on any job rather than to write them for each specific situation. It will be necessary only to refer to the file for the sheet needed.



Various layouts of operation sheets.

The operation sheet should contain the following data:

(1) Title.
(2) Objective.
(3) Preparatory information in brief form.
(4) Tools, equipment, materials.
(5) Step-by-step procedure illustrated whenever possible. The procedure should tell how to do and should not be encumbered by statements of fact or theory not necessary for the successful per-

formance of the operation. Correct, up-to-date trade terms should be used.

(6) Carefully worded thought-provoking questions.

(7) Summary and close.

To keep in step with a fast-moving world, planned instruction is essential. It will go far toward helping the instructor to educate individuals, particularly if the instruction is given in a planned and equipped school laboratory.

DO's for the Use of the Laboratory

DO develop trainee "know-how" with actual equipment, fixtures, and supplies in a realistic atmosphere.
DO convert out-moded classrooms into dynamic laboratories for learning.
DO secure all equipment, fixtures, tools, and supplies necessary in a school laboratory.
DO provide sufficient space for blackboards and bulletin boards.
DO provide facilities for the use of other instructional aids.
DO select a suitable location in the building.
DO provide proper heating facilities.
DO provide proper lighting.
DO provide adequate ventilation facilities.
DO allow sufficient room space per student.
DO lay out the laboratory to its best advantage.
DO secure co-operation of all local agencies in setting up the training room.
DO canvass local area for all available instructional equipment.
DO encourage instructor-trainee-made equipment.
DO develop "job work sheets" for each problem.
DO make and use "planning sheets."
DO keep laboratory up to date.

QUESTIONS

1. Why is an instructional laboratory an advantage?
2. What are the major divisions of equipment needed in many audio-visual laboratories?
3. What are the sources for laboratory equipment?
4. How is home-made equipment obtained?
5. How should laboratory equipment be prepared?
6. How do laboratories help "bridge the gap" between theory and practice?
7. Where should a laboratory be located?
8. How should a laboratory be arranged or laid out?
9. How should a laboratory be used in relation to good instruction?
10. What are the advantages of a student work sheet?
11. How should an operational sheet or lesson plan be prepared?
12. Why is planned instruction essential?

PROBLEMS AND PROJECTS

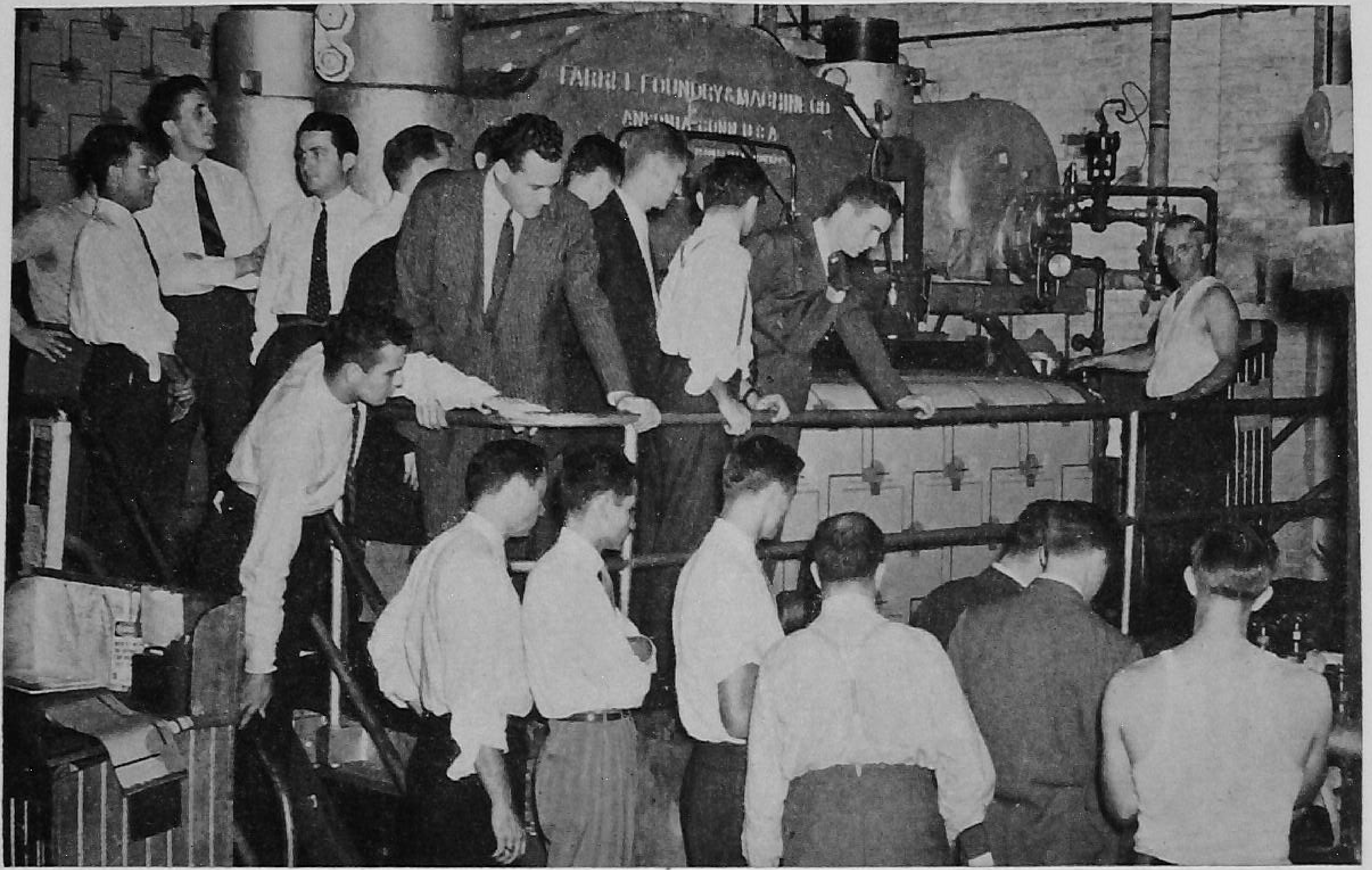
1. Draw floor plans and suggest equipment you would install for a model laboratory. Use the illustrations in the chapter as guides, but do not merely copy them. Current magazines should be consulted for new ideas.

2. Canvass the community for discarded equipment. If the equipment is usable, lay out a floor plan and arrange the equipment.

3. Plan, construct, finish, and arrange laboratory equipment. If it is not feasible to use actual equipment, employ models.

4. Make lists of supplies and audio-visual aids you believe would be desirable in an audio-visual laboratory.

5. Prepare a detailed list of equipment, supplies, text books, reference materials, audio-visual aids, and furniture for a classroom in which you are teaching or planning to teach. Be sure to include sources and approximate prices.



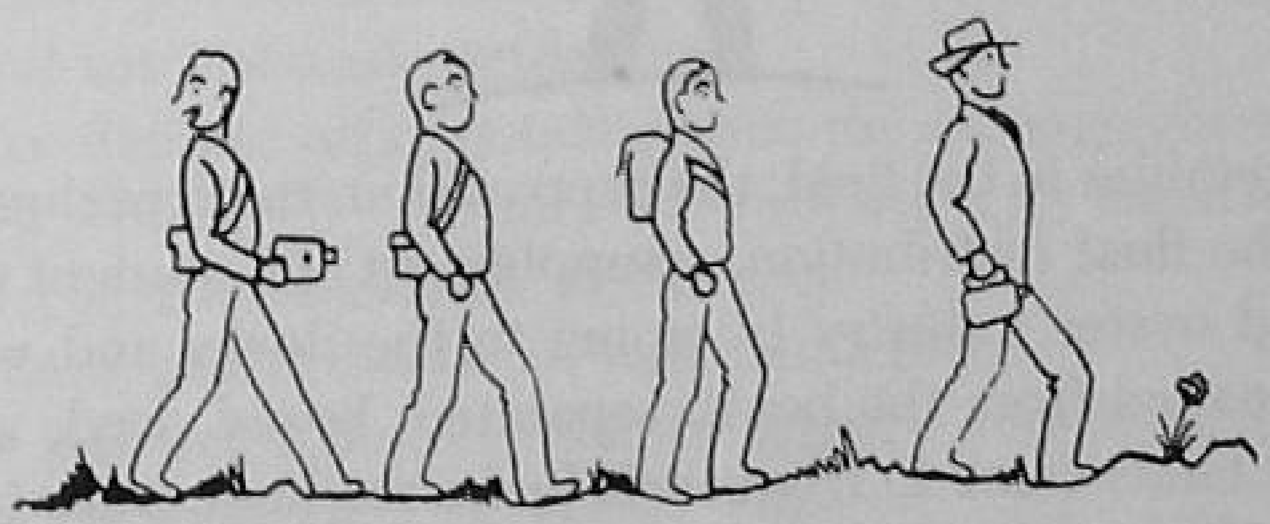
Courtesy of Armstrong Cork Co.

An in-service-training plant trip.

12

Field Trips

Few teaching programs are complete without a field trip. Not only does a trip make possible close observation of a multitude of natural and man-made things, but it also offers an opportunity for planned inspection of administration, organization, and procedure in many fields. A trip provides the student with first-hand information and real experience in a real life situation.



Students are greatly impressed by the hustle and bustle in a receiving room, the paints and posters in the copy room, and the orderly confusion of a Saturday afternoon in a busy retail store. The student remembers the damp, clean smell of a dairy, the breath-taking heat of a glass furnace, the metallic hum of a weaving room, the thick chill of a walk-in refrigerator in a meat-packing house, or the sharp, pungent odor of a tanning room.

Trip Opportunities

A simple community survey will reveal the business firms which do an outstanding job in some specific phase of distribution, processing, or manufacturing. In most cases, the managers or owners of these businesses will grant permission for a field trip into their etablishments. Government buildings, banks, courts, public service organizations, museums, power plants, military installations, and historic buildings and sites are only a few of the opportunities in your area.

No teaching possibility in the local area should be overlooked. For example, students might visit a cotton-goods manufacturer or a hosiery mill to clarify their understanding of weaves or hosiery knitting. To understand food processing, go right to the packing plant, observe the

picking of vegetables in the field, the preparation, the freezing or canning, storing, and the final distribution. Supplement the student's knowledge of the fish and oyster industry by going to the docks and watching the fish being unloaded from the boats, separated, boxed, iced, and shipped. See the oyster boats come in from their beds, the huge piles in the shucking houses. Watch the lightning speed with which the oysters are opened, sorted, canned, and shipped. For a study of the channels of distribution, watch the produce come into a large city market in boats, trucks, and carloads. Notice how the produce is distributed to the commission merchants; listen to the early morning auctions; see the packages bought, tagged, and loaded on the wagons and trucks for final distribution to retail stores. Visit the showrooms for dress goods and men's wear, the office of the resident buyer, and the central suites of the

large buying syndicates. Every type of community has something worthwhile to offer to a teaching program.

In-service field trips. Business organizations which conduct in-service training, on their own premises, for both new and experienced employees, should give the student an opportunity to observe and "try his hand" at the task in the actual job setting. It might be a job in the basement or in a department on the same floor, yet this realistic experience adds something that cannot be duplicated in the training room. In the hands of a capable instructor, the participation in life situations becomes a potent technique, especially when it is carefully correlated with the specific topic in the training program. The field trip has an added advantage when used in "on-the-job training" because the student can be brought back to the classroom immediately for further discussion, testing, or review. Discrepancies and new items that were noted on the trip may also be discussed and clarified at that time.

How to Conduct a Field Trip

In order to avoid a "what-are-these-children-doing" attitude, it is necessary to plan carefully each step of a field trip. The success or failure of a trip is in direct ratio to the amount and caliber of this groundwork. Each trip will present its individual problems. However, the following suggestions are basic and are applicable to the majority of training situations:

1. Determine the specific aims of the trip.
2. Select the organization or agency which will best serve the purpose.
3. Receive permission from the proper authorities to make the trip, and check all institutional regulations.
4. Make definite arrangements with the manager or executive as to (1) date, (2) time, (3) number of students, (4) number of company guides, and (5) the objectives of the trip.
5. Prepare guide sheets for each student.
6. The instructor should visit the agency and become familiar with the itinerary before taking the actual trip.
7. Check on location of rest rooms and eating facilities.
8. Check transportation facilities.
9. Provide transportation for the student, or give specific directions about where to meet.
10. Limit groups to a maximum of ten students. It is difficult for one guide to handle a larger number.
11. Make sure each student knows what to observe.
12. Be punctual. Arrive and depart at the set time.

When the instructional program is conducted on the premises, and a trip is taken to a department in the same plant, some of the above steps may be omitted. However, in most situations, these steps are essential and they must be carefully planned to assure a successful field trip.

Guide sheet. A guide sheet is a check list of the important points the student must observe or about which he should gain information during the trip. The guide sheet should also contain the name of the organization visited and its location, date, time, the name of the company guide, and the specific objective of the field trip.

The check list enables the student and the store guide to stick to the plan and to attain the desired objectives most efficiently.

Lay out the guide sheet in block form or leave sufficient space for

RESEARCH BUREAU FOR RETAIL TRAINING
UNIVERSITY OF PITTSBURGH

Visual Aids in Distributive Education

Meeting # H. Q. Packer, Instructor

STORE TRIP

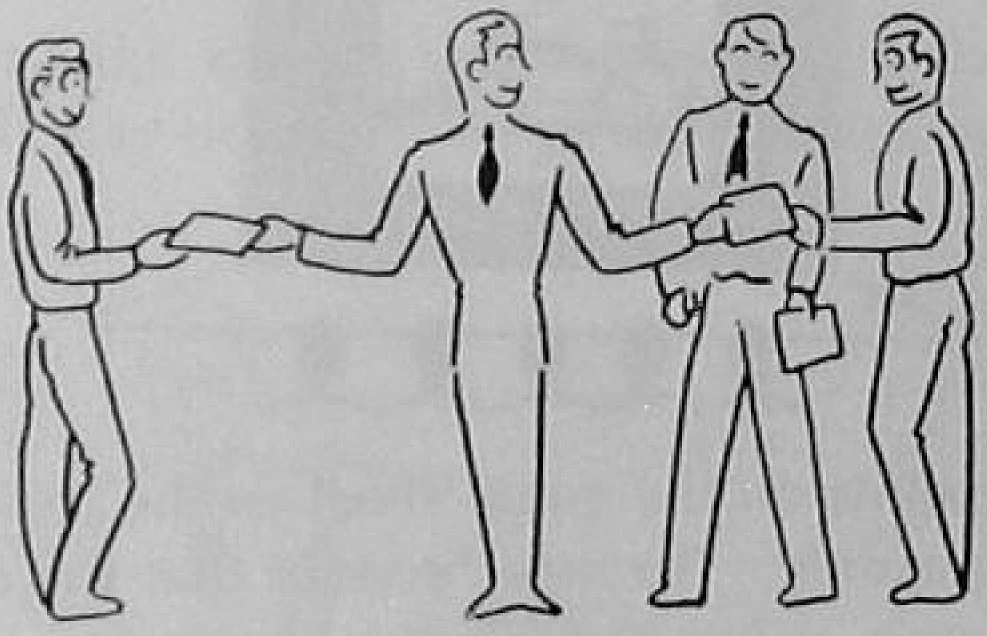
Objective: General reconnaissance of store procedure, organization, and layout.	
Store:	Location:
Guide:	Date:
1. Store origin and type:	9. Store layout:
2. Store system:	10. Buying:
3. Merchandise department:	11. Receiving and checking goods:
4. Publicity department:	12. Marking goods:
5. Maintenance department:	13. Pricing:
6. Finance and control department:	14. Merchandise control:
7. Personnel department:	15. Advertising:
8. Personnel training:	16. Window and store display:

A guide sheet.

notes after each point. If possible, allow space for small sketches, drawings, and maps. If space is not available on the front of the sheet, the back may be used for this purpose. For example, the guide sheet on the opposite page was prepared in the Visual Aid Workshop at the University of Pittsburgh.

Duplicate copies of the guide sheet should be distributed to the students and discussed before the trip. Each point should be clarified, and if the student is unfamiliar with the check-list technique, the instructor should explain how it is used.

The student should record brief notes of all pertinent points directly on this guide sheet, preferably in the allotted spaces. Sketches, drawings, and maps should also be placed directly on this sheet. These facts should be recorded during the actual trip, or as soon afterward as possible. If the guide realizes that the student is taking brief notes, he will be pleased to adjust his speed accordingly. At the completion of the trip, the completed guide sheets will serve as the basis for the follow-up discussion in the classroom.



It is essential that the manager or guide have a copy of the guide sheet several days prior to the trip to give him sufficient time to make all necessary preparations. At that time, the instructor and the guide should check each point in the guide sheet together, to avoid any misunderstanding.

How to Use the Field Trip

A field trip must be well planned and executed, and in order for the student to learn as much as possible, the trip must also be properly correlated with a specific learning situation. It may be used to (1) introduce or arouse student interest in a unit of work, (2) give the student specific information or skill training, (3) follow up or review a teaching job, and (4) inspire a student with good attitudes.

The exact technique will depend upon the specific use of the field trip. However, the following pattern should be observed to assure proper utilization.

The amount of time devoted to each step will depend upon student caliber, nature of the problem, the physical limitations of the trip itself, and the purpose of the specific field trip.

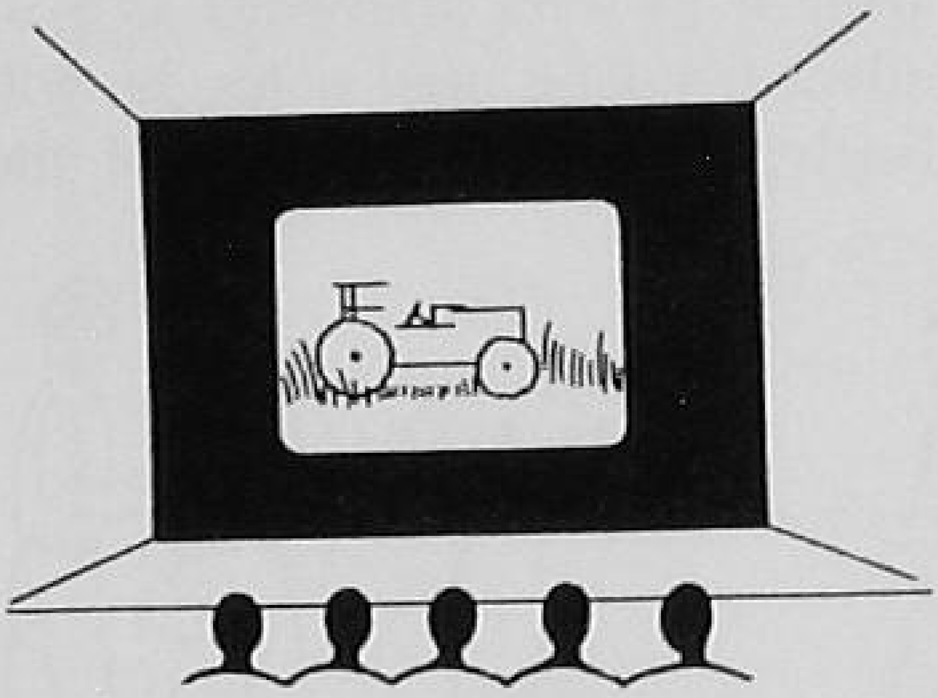
1. *Prepare student.* The instructor will find that the field trip is such a popular and potent visual aid that it is comparatively easy to arouse

the student's interest in it. However, it is important that the instructor point out what specific things the student should observe during the trip. The student should also be informed how a knowledge of these facts will help him.

Allied audio-visual aids, such as flat pictures, maps, charts, posters, slides, motion pictures, filmstrips, and slidefilm should also be used to put the student in the proper frame of mind.

If the student realizes that his ability will be tested at the completion of the field trip, it will act as an added incentive to pay close attention to all details.

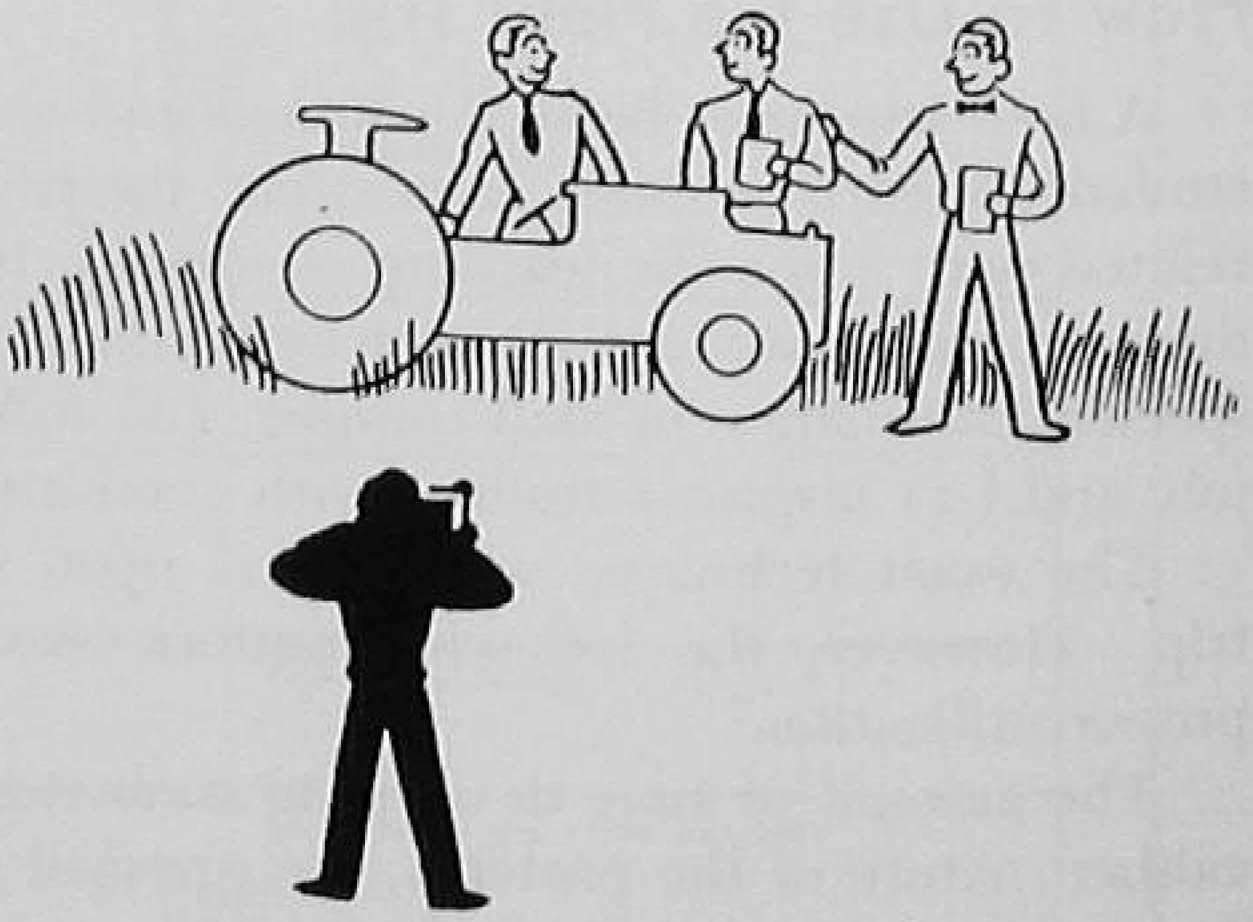
Specific information regarding time and location of the field trip should be given to the student before he leaves the classroom.



2. *Conduct field trip.* To avoid exposing the student to a tumult of confusing sensations, carefully follow the plan suggested in the previous unit on "How to Conduct a Field Trip."

Do not underestimate the value of a guide sheet: it is a necessary device in a successful field trip. The student should fill in the important points on the guide sheet as the trip progresses or as soon afterward as possible. To make certain that the executive, manager, or guide covers each point, provide him with a copy of the guide sheet, and check through it together several days prior to the trip.

If the business regulations permit, prepare flat photographs, slides, or motion pictures depicting the important points covered in the trip. Motion pictures and slides will require a period of time for development, but flat pictures may be used in the immediate follow-up, provided the instructor has developed a darkroom technique or availed himself of a rapid-film-developing service in the community. The finished motion pictures or slides may be adequately used in a review at a later date.



Carefully catalogue and file all field-trip material for future reference and evaluation.

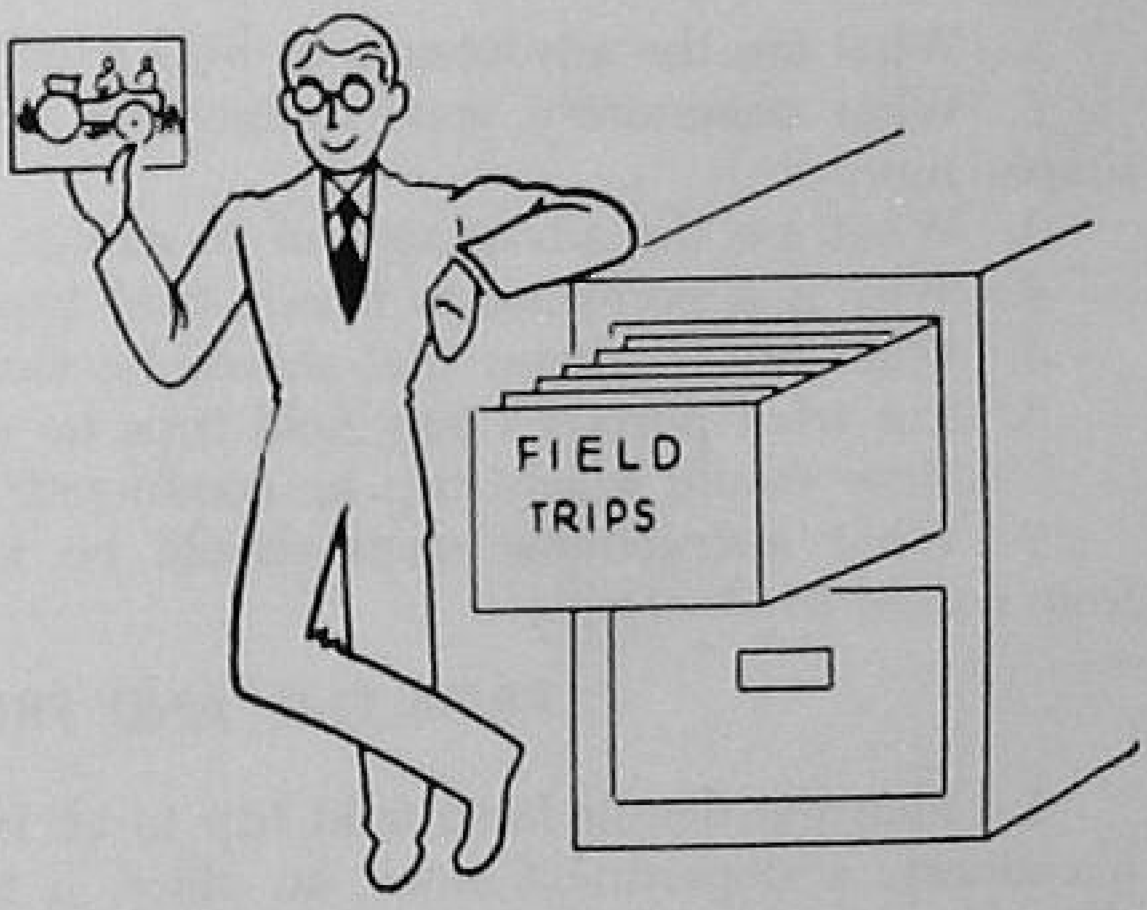
3. *Follow up field trip.* Each field trip should be followed up as soon as possible by student application, discussion, and further teaching if the trip was the type that gave the student an opportunity to "try his hand" on the job.

If the purpose of the trip was to observe a skill, the student should be asked to perform the job in the classroom. A trip that was conducted for obtaining factual information should be followed up by a class discussion to clarify any weak points or misconceptions.

Each step of the manipulative skill, or each detail of the factual information should be carefully checked. Utilize the student guide sheet to accelerate this procedure. Because the guide sheet serves to refresh the student's mind and forms the basis of the classroom discussion, its use is essential.

4. *Test student.* It is of the utmost importance that the student's knowledge and ability be adequately tested. All weaknesses and errors must be corrected immediately.

The specific methods used to test the student will depend upon the nature of the job. Generally, a skill may be tested by giving the student an opportunity to perform the job. Factual knowledge or attitudes may be tested by pertinent check lists or brief objective tests of the true-false, multiple choice, completion, and matching type.



The student should be able to perform the task with the proper timing and speed. He should also be expected to use appropriate technical terms in explaining his job.

5. *Review the teaching.* All errors which are detected by student testing should be corrected immediately. However, by all means avoid criticizing the student. Employ a constructive and tactful technique. Much more can be accomplished by maintaining friendly relations with the student than by earning his hostility.

Reshow the flat pictures that were prepared during the trip. If possible, exhibit the slides or motion pictures that were also prepared at that time. In fact, utilize any material on file, in relation to the field trip, that will help solve the problem. The all-important thing is that the student should be able to perform the job satisfactorily. *Remember, if the instructor has taught—the student can perform.*

DO's for the Use of the Field Trip

DO avoid "spur of the moment" trips.
DO survey all trip possibilities in local area.
DO plan each detail of the trip carefully.
DO use the trip for on-the-job instruction.
DO prepare guide sheets for each trip.
DO make certain the student knows what to observe.
DO make certain the manager or guide knows what he is to show the student.
DO prepare the student before making the trip.
DO be punctual.
DO work in small groups.
DO follow plan as outlined in guide sheet.
DO correlate the trip with the specific problem.
DO prepare flat photographs, slides, or motion pictures of the trip.
DO follow up the trip as soon as possible.
DO test the student.
DO use pictures, slides, and motion pictures for review purposes.
DO evaluate and check results of each trip.
DO catalogue and file all trip material for future reference.

QUESTIONS

1. What are the advantages of field trips?
2. What community opportunities for field trips will be revealed by a simple survey?
3. What are the advantages of in-service, or in-plant field trips?
4. Why is it necessary to plan a field trip?
5. What are the items that should be included in a plan for a field trip?
6. For what purposes may field trips be used?
7. How should a field trip be conducted?
8. What instructional steps should be followed to get the most value from a field trip?

PROBLEMS AND PROJECTS

1. Plan the details for a field trip to an industrial plant, a packing house, a cannery, a department store, an office, a board of trade, a clearinghouse, through a forest, or any other place that offers opportunity for observation and learning. Include in your plan all of the suggestions contained in your text. This plan should be written and preparations made to present it to your class or group.
2. Prepare a detailed plan for an "in-service" field trip. Follow instructions for these projects as outlined in your text. Write your plan in the form of a report and prepare yourself to present and defend it before your class or group.
3. Prepare a report indicating how you would use a field trip to help arouse interest; give student information or skills; follow up or review instructions; inspire and create good attitudes. This report should be brief, but complete.
4. Explain in a brief, written report how you would use the five steps for good instruction in connection with a field trip.
5. List the "Do's for the use of the field trip."

Courtesy of Webster-Chicago Inc., Chicago.

Using a wire recorder in a language class to speed up the process of learning, pronunciation, and accent.

13

Radio, Recording, and Playback Equipment

Radio in the Classroom

A great many city and rural schools use radio in the classroom. The absence of electric power, distance from a broadcast studio, lack of suitable radio programs, and the feeling of some school principals that the radio has a "disturbing effect" upon the class have prevented the use of this important teaching aid in other classrooms.

Lack of electric power in some rural districts has been overcome by some of the more resourceful teachers—they simply continue to use the old-fashioned "battery" radio set. But the tremendous extension of power lines will soon make this problem nonexistent.

Improvements in radio receiving sets and broadcasting equipment, the growing number of local broadcasting stations, and the increased power are rapidly shortening the distance between school and broadcast studio. Many of the smaller local stations are rapidly becoming affiliated with the larger networks such as ABC (American Broadcasting Company), CBS (Columbia Broadcasting System), NBC (National Broadcasting Company), and the Mutual Broadcasting Company, thus bringing some of the better programs within the range of most classrooms.

The absence of suitable radio programs is a real problem at the present. Many teachers who are anxious to use the radio in the classroom

find no suitable programs during school sessions. Occasionally these programs occur during the late afternoon, but more frequently in the evening, when radio has its largest group of listeners. The commercial aspect of broadcasting in the United States makes this essential. But broadcast studios have indicated a willingness to cooperate with education in presenting suitable programs at a convenient time, and from every indication a conscientious effort is being made to this end.

Finally, the principal who states that "radio has a disturbing effect in the classroom" is becoming rarer. Education should be dynamic, moving, and because of its very nature—disturbing! The principal is correct, however, when he questions the value of merely turning on the radio in the classroom and not doing anything else with the lesson. If the radio program is properly used in the classroom, it can (1) provide students with information, (2) increase discernment of social significance, (3) develop desirable attitudes, (4) increase appreciation of aesthetic values, (5) stimulate interest and further study, and (6) arouse students to think and act.

Types of Radio Programs on the Air

A brief scanning of the radio page in a local newspaper shows the many varieties of programs. There are children's programs, women's programs, religious, agricultural, and commercial programs, such as variety shows, comedy, drama, music, news, audience-participation, and quiz programs. There are also a large number of educational programs broadcast by state departments of education, universities, colleges, and public schools in San Francisco, Chicago, Detroit, Cleveland, Rochester, and New York.

"School of the Air" type program. Many schools in states such as Connecticut, Ohio, Texas, and Wisconsin have benefited by the "School of the Air" type program for several years. Usually these programs are planned by teachers and students under the auspices of a college or university. Someone designated by the college assumes the responsibility of supervising the planning and production of the program. The material is correlated with the subject matter being taught in the elementary and high schools in the listening area. Instructors receive advance information concerning these programs and have sufficient time to prepare lesson plans. In some cases, teaching aids such as check lists, discussion manuals, charts, graphs, maps, diagrams, and posters are made available to the instructor, to assist him in doing a better teaching job in the classroom.

Indiana University with its "Indiana School of the Sky" series used twelve commercial broadcasting stations to broadcast special programs to elementary schools and planned to do the same for high schools. The

University of Kentucky, in co-operation with WHAS in Louisville, actually broadcasted regular college courses for credit, including an enrollment procedure, testing, and tuition charges. These are just a few of the projects being carried on by our colleges. Communicate with colleges in your area. If they are not conducting broadcasts now, they may be planning to do so. An indication of interest by teachers in the area would certainly encourage the colleges to hasten their plans. Some of the colleges now sponsoring education radio broadcasts are as follows:

State	*City*	*Station*	*Sponsor*
Florida	Gainesville	WRUF	University of Florida
Georgia	Atlanta	WGST	Georgia School of Technology
Illinois	Urbana	WILL	University of Illinois
Indiana	Lafayette	WBAA	Purdue University
Iowa	Ames	WOI	Iowa State College
	Decorah	KWCL	Luther College
	Iowa City	WSUI	State University of Iowa
Kansas	Lawrence	KFKU	University of Kansas
	Manhattan	KSAC	Kansas State College
Michigan	East Lansing	WKAR	Michigan State College
Minnesota	Minneapolis-St. Paul	WLB	University of Minnesota
	Northfield	WCAL	St. Olaf College
Missouri	St. Louis	WEW	St. Louis University
New York	Ithaca	WHCU	Cornell University
	Troy	WHAZ	Rensselaer Polytechnic Institute
North Dakota	Grand Forks	KFJM	University of North Dakota
Ohio	Columbus	WOSU	Ohio State University
Oklahoma	Norman	WNAD	University of Oklahoma
Oregon	Corvallis	KOAC	Oregon State Agricultural College
Pennsylvania	Grove City	WSAJ	Grove City College
South Dakota	Rapid City	WCAT	South Dakota School of Mines
	Vermillion	KUSD	University of South Dakota
Texas	College Station	WTAW	A and M College of Texas
Washington	Pullman	KWSC	State College of Washington
Wisconsin	Madison	WHA	University of Wisconsin

Broadcast stations as a rule are anxious to cooperate with local schools in conducting educational programs. A letter, visit, or telephone call to your local radio station will convince you of their willingness to co-operate in preparing a special educational broadcast.

How to Use Radio Programs in the Classroom

The techniques for using the radio in a classroom depend on subject matter, grade level, number of students in the class, and the time allotted to the lesson. To insure a good lesson the instructor should consider (1) how to get ready, (2) the physical aspects of the classroom, and (3) procedure of teaching the radio lesson.

How to get ready.

1. *Secure a radio.* Any radio set may be used as long as it receives the desired station and can be heard clearly by every student. A console type radio has a large speaker and is the most suitable for a large group. A portable radio may be used in smaller classrooms. Of course, in a large auditorium or gymnasium, it is necessary to use amplifying equipment. Most central sound systems have facilities for increasing the volume of the radio for the auditorium, gymnasium, and other large rooms. If a portable radio is being used, make sure it is in a central position.

2. *Secure advance notice of radio programs.* In order to plan your lessons carefully, find out the dates and times of specific programs by contacting your local radio station. Many large networks and some local stations print monthly programs. The major networks also have teachers' manuals for their programs, such as the "University of the Air" (NBC), "University of Chicago Round Table" (ABC), "America's Town Meeting of the Air" (ABC), and "American Forum of the Air" (Mutual Broadcasting Company). Write directly to the following broadcasting companies for further information concerning their education programs:

American Broadcasting Company, 30 Rockefeller Plaza, New York, N. Y. (Program outlines.)
Columbia Broadcasting Company, 485 Madison Ave., New York, N. Y. (Programs and teachers' manuals.)
Mutual Broadcasting Company, 1440 Broadway, New York, N. Y. (Monthly programs.)
National Broadcasting Company, 30 Rockefeller Plaza, New York, N. Y. (Programs and teachers' manuals.)

3. *Secure advance information or radio programs.* Because it is almost impossible to "preview" a radio program like a motion picture, it is essential that you secure all possible information about the program before the broadcast. Some local stations will provide you with a copy of the actual script, and the major broadcast stations are preparing lesson plans and teaching guides for some of their better educational programs. Reprints of broadcasts are also available for many programs. Occasionally a small charge is made for this material. A post card or letter to the radio stations listed will bring you information about available material. Use these lesson plans and teachers' manuals to guide you in conducting your own lesson. The radio program takes on added importance as a teaching aid if the teacher has studied the program before the broadcast.

The physical aspects of the classroom. It is not necessary to have a special room to use the radio. Classrooms with acoustically treated walls and ceilings provide the ideal setting for a radio lesson, but a classroom that has an electric outlet and is fairly quiet will prove satisfactory.

1. *Electric outlet.* Check the electric outlet before using the radio.

Make sure it does not shut off when the room light is turned off. If the outlet is not near the radio, make sure you have a good extension cord. Radios operate on alternating or direct current, so check your equipment and current before using.

2. *Location and table for radio.* Place the radio in a central location. Experiment in various positions for the best location. If a portable radio is used, place it on a solid table. The radio should be facing the group for best results.

3. *Seating arrangement.* If the room is equipped with movable chairs, a circle or semicircle can be formed around the radio. If table and chairs are provided, a U-shaped or conference-styled arrangement might be used. In a room equipped with permanent desks and seats the radio is usually most effective in front of the class. A portable radio should be at least table height to assure the best sound.

4. *Ventilation and heat.* The proper methods of ventilating and heating should always be observed. A stuffy room is not conducive to learning. With a temperature above 72 degrees or the humidity above 50 per cent, learning becomes difficult. Check these factors in your classroom.

5. *Lighting.* Ordinary classroom lighting will suffice. Make sure that rays of sunlight do not cause discomfort. Adjust shades before the session starts. Several teachers experimenting with lighting during a radio lesson feel that lowering the lights before turning on the radio helps the student to concentrate more on the radio presentation. You might try this technique in your own classroom.

6. *Other classroom facilities.* Like all good classrooms, it should be equipped with a blackboard, bulletin board, and a rack or stand for charts, posters, and other illustrative material. During the radio presentation, the teacher may write the major points on the blackboard or point to pictures, maps, charts, graphs, or diagrams to clarify the radio presentation.

7. *Check the radio.* Before the class meets, test the radio, by tuning in the proper station. Everything should be ready before the group meets.

Procedure for teaching the radio lesson. Your teaching method and technique will depend largely upon the nature of the lesson, the level and type of students, the number of students, the time allotted for the lesson, and on the nature of the job the radio program is to perform. It could be used to introduce a new lesson, present a complete lesson, or review and augment a previous lesson.

The following steps should be observed in all lessons:

Study advance information about the program and carefully plan your lesson accordingly. Get all possible information from the radio station concerning the broadcast. If a teachers' manual is available, much of

your work is done. But if nothing is available, try to anticipate some of the major ideas that will be presented. Fill in the other points during the broadcast.

Arouse student interest by telling them how they will benefit by the broadcast. The student should know what to listen for. Tell him about the discussion and test or check list following the broadcast. This step of preparing the student is important in any good lesson, but in a radio lesson it has added importance because of a new factor in "timing." It is essential that the teacher guide the "student preparation" part of the lesson so that it ends in time for the broadcast.

Present the broadcast. Good showmanship is essential in this step. Watch the clock. Close the "student preparation" about a minute before the broadcast, to allow time for the tubes to heat up. Everything should be ready—just turn the switch. In order to assure perfect timing, synchronize your watch or clock with a reliable source before the broadcast. Check the volume throughout the broadcast.

Some instructors write the major points of the program on the blackboard during the broadcast. Other instructors point to conveniently placed maps, charts, graphs, or diagrams to illustrate points during the broadcast. Too much of this illustration distracts attention from a program, but these techniques are very helpful to the student if carefully handled. If you decide not to use the blackboard during the broadcast, be sure to jot down all important points covered in the program to assist you in the discussion following the broadcast.

Discuss or apply information given in the broadcast. Immediately after the broadcast discuss the major points of the program. Encourage each student to participate in the discussion. As these points are presented, they might be put on the blackboard. Use other visual aids to clarify ideas. If the nature of the program suggests activities, such as student projects, outside readings, field trips, and other follow-up work, they should be tried out as soon as possible.

Check the student's understanding of the program. A test or simple check list will indicate the student's understanding of the lesson. Some of the teachers' manuals that accompany broadcasts contain a suggested test or quiz, but don't hesitate to revise these tests to meet your own needs. A lengthy test is not necessary. A short objective test covering the chief points of the presentation would be sufficient. After checking the student tests, you should clarify any errors and misunderstandings.

How to Prepare an Educational Radio Program

Many radio workshops are conducted in schools and colleges, and numerous textbooks dealing with the preparation of educational radio programs have been published in the past few years. Books such as the

following are probably available in your local libraries, for additional assistance in preparing good radio programs.

Handbook of Broadcasting, McGraw-Hill.
Radio in the Classroom, Prentice-Hall.
Radio in the Classroom, University of Wisconsin Press.
Teaching Through Radio, Farrar and Rinehart.
Teaching With Radio, Ohio State University.
Educational Broadcasting, University of Chicago Press.
Radio Workshop, Federal Radio Education Committee.
Schools of the Air and Radio in the High School Curriculum, Federal Radio Education Committee.
Children and Radio Programs, Columbia University Press.
Local Broadcasts to Schools, University of Chicago Press.

The major broadcast companies and many local stations have educational directors who would be glad to help in preparing your programs.

Types of educational radio programs. There are three types of programs for educational use: the talk, the discussion, and the dramatic program. In selecting the one that will best suit your purpose, keep in mind

(1) The time allotted for the program,
(2) The nature of the program,
(3) The level and type of listeners in the classroom,
(4) The objectives of the program.

Planning the program. If possible, it is desirable to have a committee assist in preparing the script in order to avoid a one-sided point of view. Always keep in mind the classroom audience and anyone outside who might be listening to the program.

1. *The talk program.* The talk type program is the most common educational program. Usually the talk program is not so interesting as the discussion or the dramatic type. But it takes less time and effort than the others. In preparing the talk, say the words aloud as you write them, to achieve naturalness. Use frequent illustrations, such as humorous episodes, case studies, and human interest stories. Avoid lengthy quotations and statistics. Think and talk in terms of word pictures. Finally, the good radio talk not only gives the listener ideas, but also gives him something to do, such as follow-up study, student projects, and outside reading.

2. *The discussion type program.* This type of program consists of interviews, forums, panels, and round table types of discussions. They are more interesting than the usual talk program and not too difficult to prepare. More than one voice on the program breaks the monotony and affords a more interesting presentation. Of course, much depends on the ability of the interviewer, the discussion leader, or the moderator to set the pace for the discussion. He can encourage spontaneity and keep

the discussion alive and interesting. He also opens the program and summarizes the outcome at the close of the discussion. The actual script for the discussion type program varies. In some cases even though a panel or interview is being held, the entire discussion has been carefully planned, and speakers merely read it from a script. You have detected this technique on the air. Some discussion programs have the opening statements of each participant planned, and they are read from the script. But the discussion that follows is extemporaneous and the participants merely have an outline of the program to follow. Sometimes discussion programs are entirely unrehearsed, and only the moderator follows an outline. Because these programs are not rehearsed, it is important that the participants and especially the moderator be chosen carefully.

3. *The dramatic program.* A good dramatic program is usually effective, but it is also more difficult to prepare. Of course, many topics have no dramatic value and should not be dramatized. It is more effective to use the radio talk or discussion type of program for topics of that kind.

A dramatic presentation should have

(1) An interesting plot
(2) Action
(3) Suspense
(4) A climax.

Review several dramatic scripts and talk over your ideas with the educational director of your local broadcast studio before starting to work on your own script. The following suggestions will help in preparing a script for a dramatic program:

1. Always remember the audience in the classroom. The program should be geared to their level. If the pupils are in the third grade, the program should be prepared for a third grade level. If you are planning the program for more than one level, such as the fourth, fifth, and sixth grades it should be understandable to the lowest level in the group—in this case, the fourth grade.

2. Think and write in terms of pictures. On the stage you have the help of the props, scenery, and living characters. But on the radio your voice and a few sound effects must do the whole job, making word pictures essential.

3. Before starting the script, write a synopsis of each scene. Have several interested people read it. After a few days, read it again yourself to see if the plot is still as interesting as it was.

4. Remember, the dialogue is supposed to describe the situation or setting as well as tell a story. A character should be called by name in

the dialogue until he can be identified by his voice. Unfamiliar sound effects should also be identified by the dialogue.

5. Sound effects should be used sparingly in an amateur educational radio production, and avoided altogether unless they are really necessary. Think of the student reactions in the classroom to sound effects that are poorly imitated or carelessly timed.

6. Tactfully stress key ideas so that they may easily be detected by the listeners.

7. Keep scenes and plot as simple as possible. Complicated plots cause students to lose interest.

8. Keep scene-shifting at a minimum. Shifting back and forth between scenes may confuse the student. Music, sound effects, or a slight pause can indicate the transition from one scene to another.

9. Avoid the use of "voice fading" technique. It is occasionally used to indicate that a character is leaving the scene. But, in too many instances the students interpret it as something wrong with the radio.

10. Avoid sentimental scenes in educational broadcasts. It seems that scenes of this nature have a peculiar effect on a group of students in a classroom, even when the performers are professionals.

11. Dramatic programs should be carefully rehearsed and timed. If the time is indicated at the bottom of each page, it is well to indicate whether you should speed up slightly or slow down. A good way to practice your presentation is to record the program on an instantaneous recorder (wire, tape, or record) and study the playback. If a wire or tape recorder is used, the program may be erased and done over again as many times as necessary on the same wire or tape.

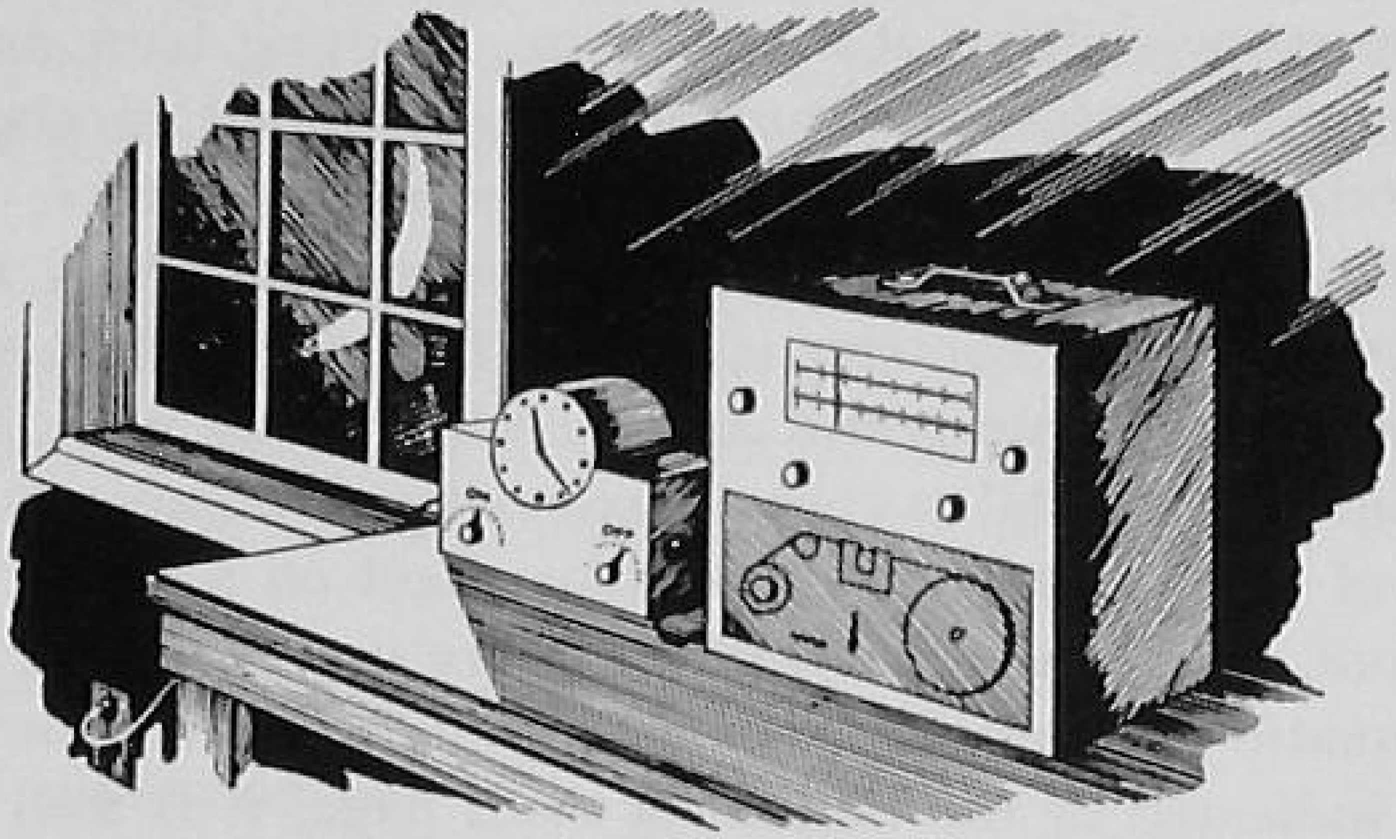
12. The script should be typed double space and each page should be numbered. To avoid paper-rattle, do not staple or clip the pages together. Many local stations require copies of the script several days before the broadcast. Check with your station to see if they require a script.

Much has been written about delivery, "mike-fright," and microphone technique. Your delivery will improve with practice. "Mike-fright" is similar to the nervousness you experience before addressing a large audience. But everyone gets the feeling, including the experienced speaker. The only difference is that the experienced speaker expects it and uses it to make his delivery more effective.

As far as microphone technique is concerned, before you start rehearsing the educational director or studio engineer will show you where to stand—usually two feet from the microphone. Do not put your script between your mouth and the microphone, as this practice makes your voice appear far away. Practice on a home or school recorder will certainly improve your technique.

Recordings and Playback Equipment in the Classroom

Valuable radio programs that are broadcast outside of school hours may be recorded on discs, wire, or tape and played back in the classroom when needed. Such recordings may be only temporarily useful or may be welcome additions to the permanent recordings collection. In the former group, newscasts are of short-lived value, but an important historical event such as a presidential speech, recorded and retained, becomes a valuable addition to the library of recordings. In many cases,



Courtesy Radio Manufacturers' Assoc.

Using an inexpensive time-clock to record a broadcast without anyone being present.

round table or other discussion programs that concisely state or strongly defend significant points of view often have continuing documentary value, useful for demonstrating comparisons, contrasts, and the evolution of ideas.

English, social studies, music, science, and foreign languages take on new reality through the proper use of recordings that recreate the original atmosphere. Although some of this material is obviously ephemeral in its application to learning, much of it is of permanent value.

Instantaneous recording and playback equipment is also valuable for immediate classroom learning and consequently should be available for use by students and teachers in all fields, particularly speech, English, music, and the foreign languages.

Sources of educational recordings. Besides being able to prepare your own records, it is possible to borrow or buy a variety of commercially prepared records for classroom use. The record shops in your community may carry only popular and classical music, but they do have access to many other subjects. The following are examples of educational recordings now available for use on the elementary, intermediate, junior, and senior high school levels.

Babar
Genie, the Magic Record
Peter Rabbit and Other Tales
Uncle Remus
Songs of Safety
Manners Can Be Fun
The Happy Prince
Rolito
The Churkendoose
The Small One
The Children's Hour
Our Common Heritage
Treasure Island
Pinocchio
The Cask of Amontillado
Tubby the Tuba
Trains
The Little Tune That Ran Away
Snow White and the Seven Dwarfs
Winnie the Pooh
Symphony Orchestra Woodwinds
Peter and the Wolf
The Man Without a Country
In the American Tradition
The Snow Goose
Tales of the Olympian Gods
The Lonesome Train
No Man Is an Island
Square Dances
Rip Van Winkle
Lost Horizon
The Pied Piper of Hamelin
The People, Yes
Typing to Music
Language records for Spanish, Italian, French, Portuguese, and other modern languages

Local libraries and many colleges also distribute recordings through their audio-visual education departments. Make inquiry concerning these services and request a catalogue listing their offerings. Catalogues of educational records dealing with conservation, natural science, health, welfare, safety, literature, speech, music, art, science, social studies, and many other subjects may be obtained from the organizations listed below:

American Bird Song Recordings Made by Cornell University, J. H. Comstock Company, Ithaca, N. Y.

American Folklore Recordings, Music Division, The Library of Congress, Washington 25, D. C.

British Military Band Recordings, Boosey and Hawks, Inc., P. O. Box 419, Lynbrook, N. Y.

Catalogue of Radio Recordings, The Federal Radio Education Committee, Federal Security Agency, Washington 25, D. C.

Catalogue of Selected Educational Recordings, Recordings Division, Film Library, New York University, 26 Washington Place, New York, N. Y.

Columbia Add-a-Part Records, Columbia Records, Inc., Bridgeport 8, Conn.

Decca Educational Records, American Book Company, 68 Lexington Ave., New York 16, N. Y.; 91 Cone St., Atlanta, Ga.; 2210 Pacific Ave., Dallas, Tex.; 121 Second St., San Francisco 5, Calif; 300 Pike St., Cincinnati, Ohio; 351 East Ohio St., Chicago 11, Ill.; 137 Newbury St., Boston 16, Mass.

English Speech—to Speak Another Language, The Linguaphone Institute, 30 Rockefeller Plaza, New York 20, N. Y.

Everyday Adventures, The Joint Religious Radio Committee, 287 Fourth Ave., New York, N. Y.

Holt Spoken Language Series, Henry Holt and Company, Inc., 257 Fourth Ave., New York 10, N. Y.

Recordings for Home and Church Only, Not to Be Used for Radio Broadcast, Department of Radio Education, International Council of Religious Education, 203 North Wabash Ave., Chicago 1, Ill.

Teach-O-Disc Recordings, Audio-Visual Division, Popular Science Publishing Company, 353 Fourth Ave., New York 10, N. Y.

Types of Recording and Playback Equipment

The ordinary record player has been used in schools for a long time. But, recently there has been a noticeable influx of other types of recording and playback units. These units use recording discs, wire, or steel and plastic tapes, and range in price from $100 to more than $1,000.

Recording discs. Records are the oldest recording media in use in the school today. In the general utility field records are usually made of a plastic such as vinylite, or lacquer-coated paper. Gelatin and some soft metals are also used. The instantaneous playback disc is made of inexpensive plastics and metals, but in the higher quality recording field, the 10-inch, 12-inch, and 16-inch lacquer-coated discs of glass or metal are most common. Records are available from 4 inches to 16 inches and vary in price from 25 cents to $4.00 or $5.00 each. The size and type to use depend upon your equipment, the purpose of the recording, and the recommendations made by your manufacturer. The instructions that accompany your equipment will give best results.

These records usually revolve at either 78, 45, or 33⅓ revolutions per minute and play from 3-5 minutes to 15-20 minutes on each side. The 16-inch record, commonly known as a transcription, is played at 33⅓ revolutions per minute. This provides 15 minutes' playing time on each side, making it easy to record a half-hour radio program on one record. A Long Playing 33⅓ RPM record provides approximately 50 minutes' playing time, and is becoming popular with many teachers. Playing time for record size, revolutions per minute (RPM), and grooves per inch are indicated in the following table:

TABLE OF PLAYING TIMES FOR RECORD SIZE, RPM, GROOVES PER INCH *

Grooves per inch	Turntable speed	Approx. minutes of recording 16″	12″	10″ record
96	78	6½	4	2¾
112	78	7½	4½	3¼
120	78	8	5	3½
136	78	9	5½	3¾
154	78	10	6	4
96	33⅓	14	8	5¼
112	33⅓	16	9¼	6
120	33⅓	17	9¾	6
136	33⅓	18	10	6
154	33⅓	20	11	6½
250	45			5 (7″ record)

Time given is for making reference recordings only and is based on using the entire blank. 17¼″ blanks when used for pressing masters should be recorded as a 16″ blank.

* *Courtesy of Radio Manufacturers Association, Washington, D. C.*

The following is a partial list of manufacturers of disc recorders and playback equipment for use in schools:

Fairchild Camera and Instrument Corp., 8806 Van Wyck Blvd., Jamaica 1, N. Y.
Gray Manufacturing Company, Hartford, Conn.
Meissner Manufacturing Division, Mt. Carmel, Ill.
Presto Recording Company, 242 W. 55th St., New York 19, N. Y.
Radio Corporation of America, Camden, N. J.
Sound Scriber Corp., New Haven, Conn.
Speak-O-Phone Recording Equipment Company, 23 W. 60th St., New York 23, N. Y.

Get in touch with your local audio-visual aids dealer or write directly to the above sources for information concerning their recording and playback units. An actual demonstration should be the basis for your selection of a specific unit.

Wire recorders. As the name indicates, sound may be recorded on a wire approximately 5 thousandths of an inch in diameter. The most commonly used spools are the ¼ hour, ½ hour, and 1 hour sizes, and cost approximately $2.00, $3.00 and $5.00 respectively. One of the outstanding advantages of wire recording is that it will not only play back the recording as frequently as desired, but it may also be used over and over again for other programs simply by "erasing" the previous program. The wire spools are compact and may easily be stored for future use. In case the wire breaks it may be spliced simply by tying a square knot.

Following is a partial list of wire recorder manufacturers:

Air King, Air King Products Company, Inc., 1523 63rd St., Brooklyn, N. Y.
Magnetone, Brush Development Company, 3405 Perkins Ave., Cleveland, Ohio.
Pierce Wire Recorder, Pierce Wire Recorder Corp., 1328 Sherman Ave., Evanston, Ill.
Polyphonic Sound, Electronic Sound Engineering Company, 4344 W. Armitage Ave., Chicago, Ill.
R.C.A. Wire Recorder, Radio Corporation of America, Camden, N. J.
Webster Model 80, Webster-Chicago Corp., 5622 Bloomingdale Ave., Chicago, Ill.
Wi Recorder, Wi Recorder Corp., 7055 Intervale Ave., Detroit, Mich.
Wiretone, Molded Insulation Company, 335 E. Price St., Philadelphia, Pa.
Wireway, Wire Recording Corporation of America, 1331 Halsey St., Brooklyn, N. Y.

Wire recorders operate on the same principle, but have a variety of features and accessories. Ask your local audio-visual aids dealer for a demonstration or write directly to the manufacturer for further information.

Tape recorders. Tape recorders use a thin piece of metal, plastic, or paper tape. The metal tape is usually an endless belt on recorders that have a continuous record-playback-erase application. The plastic and paper tapes are approximately ¼ inch wide and are reeled very much like an 8 mm. film. The tape may be played back indefinitely without deterioration and, like the wire used in a wire recorder, may be used over and over by "erasing" the previous recording. If the tape tears, it may

be repaired with scotch tape. If you wish to remove a part of the recording or insert a new section, cut the tape to remove or insert a section and then splice with scotch tape. Some tape recorders record up to 8 hours of a continuous program. A standard ½-hour roll of recording tape costs approximately $2.50.

TYPICAL SCHOOL DAY PROGRAM FOR RECORDING AND PLAYBACK ACTIVITIES*

Senior High School

FROM	TO	PROGRAM	LOCATION	EQUIPMENT USED
A.M.				
8:15	8:25	Soft Music	All rooms	Central Sound Turntable
8:45	9:00	Instantaneous Recording of Pupil Broadcast over local Radio Station		16″ Recorder
9:45	10:00	Voice Recordings of Speech Class	Speech Room	Wire Recorder
10:00	10:45	Transcription to History Class	Room 28	Portable Player
10:00	10:45	Transcription to Music Class	Auditorium	Portable Turntable and P.A. System
10:00	10:45	Record School Alma Mater by A Capella Choir	Studio	16″ Recorder
12:00	12:30	Noonday Dancing	Gymnasium	Central Sound Turntable
P.M.				
12:45	1:30	Transcription "The Constitutional Convention"	Social Science Classes	Central Sound Turntable
12:45	1:30	English Transcription Oliver Wendell Holmes	Room 16	Portable Player
12:45	1:30	English Transcription	Room 20	Portable Player
1:30	2:15	Code Transcriptions to Radio Engineers Club	Studio	Portable Player
2:15	3:00	Music Appreciation Transcription	Auditorium	Turntable and Auditorium amplifier
2:15	3:00	Record "School of the Air" Broadcast (To be used later)	Studio	Magnetic Recorder
3:00	3:45	Record "School Shop Sound Effects" to be used on future broadcast	Industrial Arts Lab.	Magnetic Recorder
Evening				
7:45	8:00	Recorded Music Played at Stadium for football game	Stadium	Portable Turntable and P.A. System

* *Courtesy of Radio Manufacturers Association, Washington, D. C.*

The following is a partial list of tape recorder manufacturers:

Ampro Tape Recorder, Ampro Corp., 2839 N. Western Ave., Chicago, Ill.
Ekotape, Webster Electric Company, Racine, Wis.
Magnesonic, Sound Recorder and Reproducer Corp., 5501 Wayne Ave., Philadelphia, Pa.
Magnetape, Amplifier Corporation of America, 366 Broadway, New York, N. Y.
Revere Tape Recorder, Revere Camera Corp., Chicago, Ill.
Soundmirror, Brush Development Company, 3405 Perkins Ave., Cleveland, Ohio.

Ask your local audio-visual aids dealer for a demonstration or write directly to the manufacturer for further information concerning tape recorders.

Selection of Recording and Playback Equipment

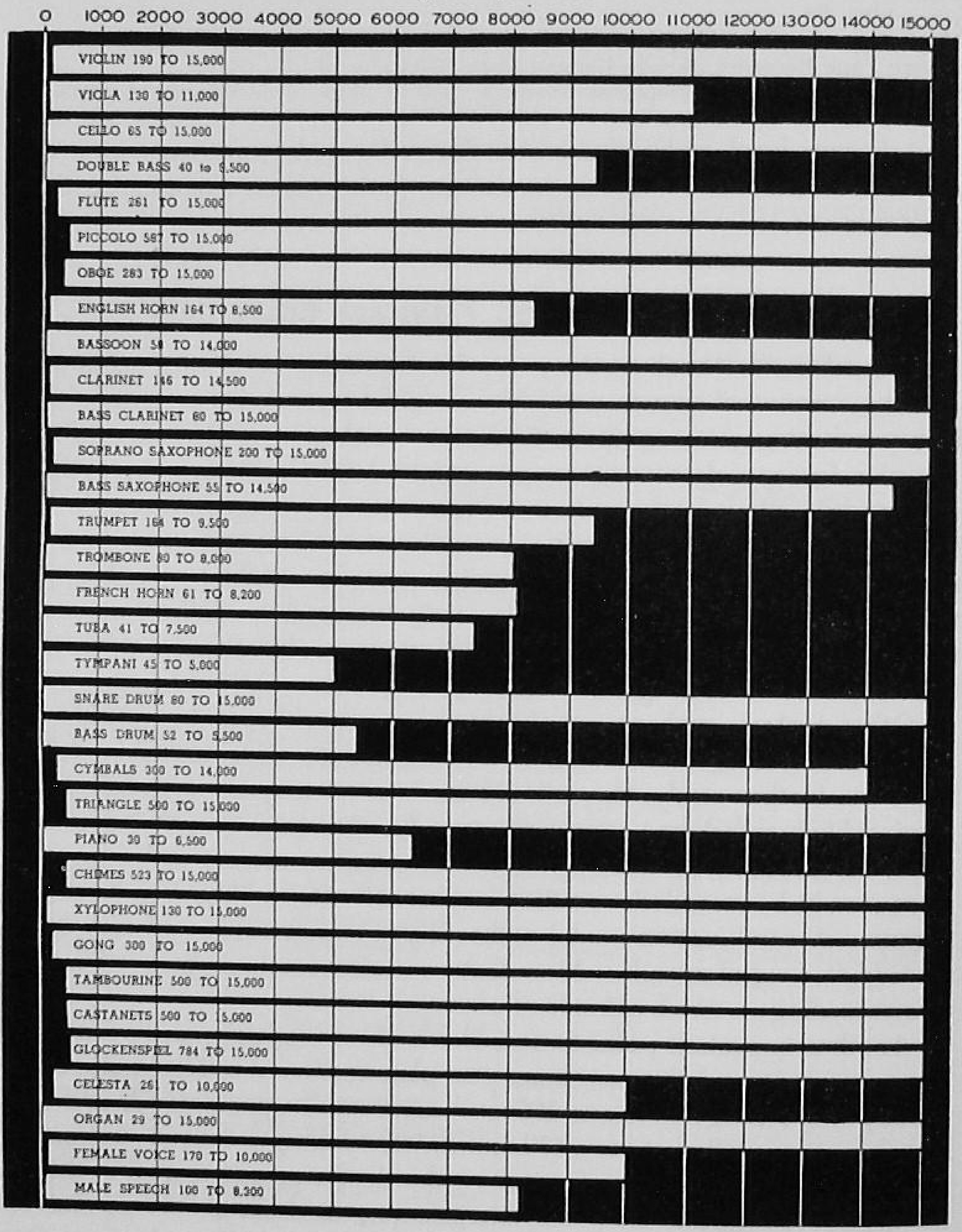
Several factors, such as the proposed use of the recording equipment and the amount of money available, should be carefully considered before purchasing your equipment. For example, if you plan to use the recorder for speech correction, you might be interested in a machine that records, plays back, and erases in a continuous operation. On the other hand, if you are interested in making a permanent recording for an English or social studies class, a disc recorder might prove the most valuable. A wire or tape recorder may be used to make temporary recordings, such as a speech or musical program that the instructor will not use over and over again.

Other factors, such as out-of-school use, should also be considered. For example, if the records made in a language class are to be taken home for further study, they should be "cut" at a speed convenient for playing back on a home record player. Records may be cut at the rate of 78, 45, or 33⅓ revolutions per minute. Of course, a much longer program should be recorded on a disc "cut" at the rate of 33⅓ revolutions per minute. A combination model makes it possible to "cut" and play back records at several speeds. Manufacturers also combine both wire and disc recording in one machine.

Another important point to consider is the sound frequency range of the equipment and the programs you plan to record. The male voice usually has a range between 100 and 8,300 cycles per second, and the female voice usually between 170 and 10,000 cycles per second—but many musical instruments have a much wider frequency range. For high-fidelity recording, the frequency range equipment should be similar to the frequency range of the sounds in the program. The chart on the following page indicates the frequency range of the voice and musical instruments.

FREQUENCY RANGE OF ORCHESTRAL INSTRUMENTS

In Cycles per Second



How to Operate Recording and Playback Equipment

Because of variations in recording and playback equipment, it is of the utmost importance that you carefully follow the manufacturer's instructions. In general, operation is either a mechanical or a magnetic process.

Mechanical recording. Mechanical recording includes both embossing and engraving techniques. In embossing, a varying groove is formed on a disc or tape by the rounded tip of an embossing tool. In engraving, a similar groove is formed by the sharp edge of an engraving tool. Mechanical recording is used almost exclusively in the record industry, in electrical transcriptions for broadcast purposes, and in general utility records.

On some recording discs the record is cut from the inside out. The grooves start at the center of the disc and the cutting head or playback needle travels toward the outer edge. This is the reverse of the usual method and is usually found only on 15-inch transcriptions.

If you follow this procedure, be sure to indicate the fact on the record label.

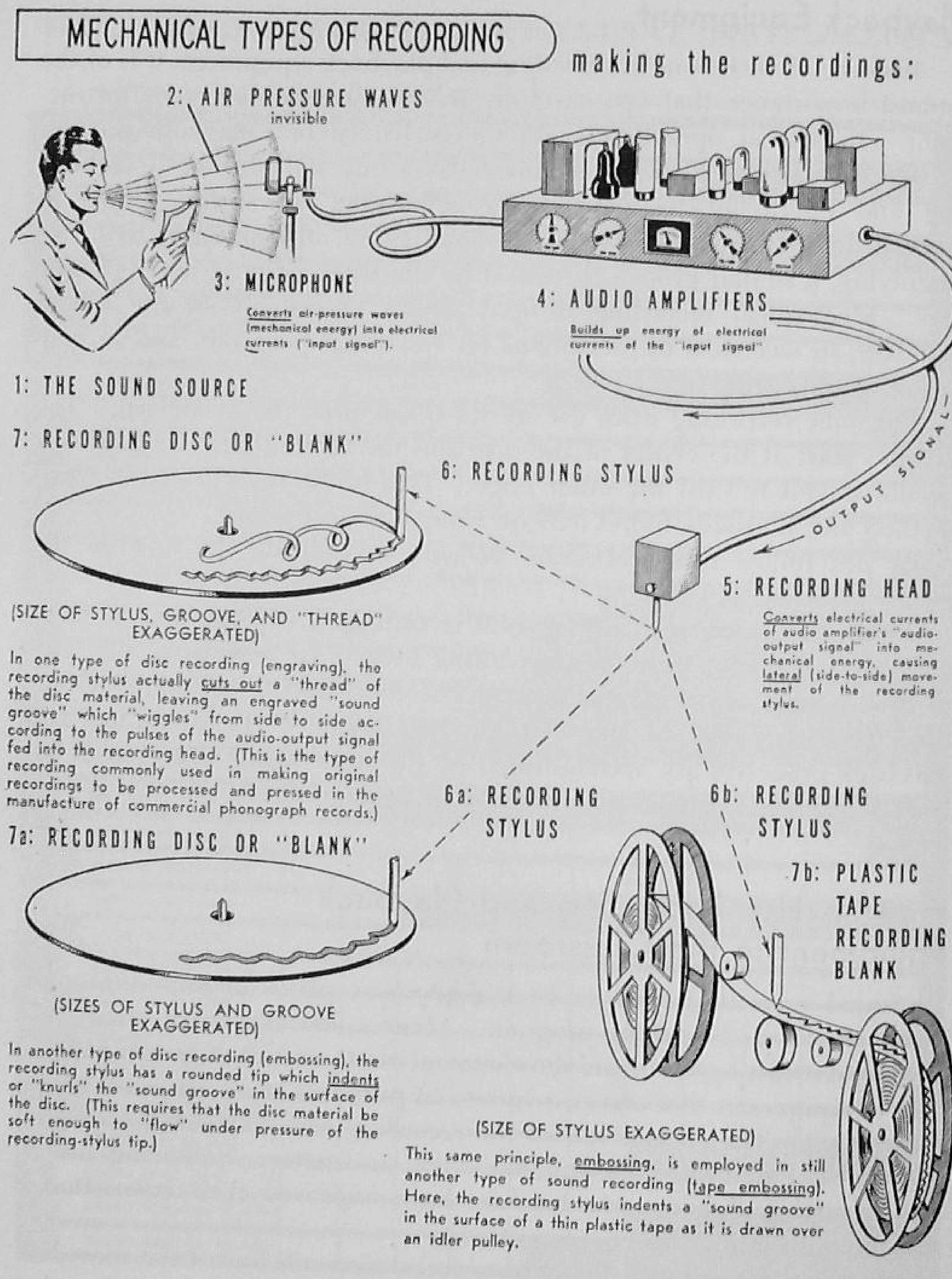
Magnetic recording. In magnetic recording, a wire or tape is magnetized as it passes through a recording head. To play back, the wire or tape is repassed through the magnetic head and the resulting vibrations, picked up by an amplifier, produce sound. The recording and playback processes are accomplished by the same head. To erase a recording, the wire or tape is neutralized or demagnetized.

How to Use Recording and Playback Equipment in the Classroom

Sound recording and playback equipment plays an important part in a well-rounded teaching program. Many audio experiences that contribute to student growth and development are the result of proper utilization of equipment that serves a variety of purposes at all ages and levels of learning. The specific use of the recording and playback equipment should be determined by the individual instructor. Following are a few examples of how some teachers have improved their instructional technique by using this equipment.

Historical documents. Many historical documents have been recorded for general distribution. These recordings can be used to revive the mood of a period, to recreate the atmosphere under which the document was delivered, and lend vividness, reality, and urgency to the learning.

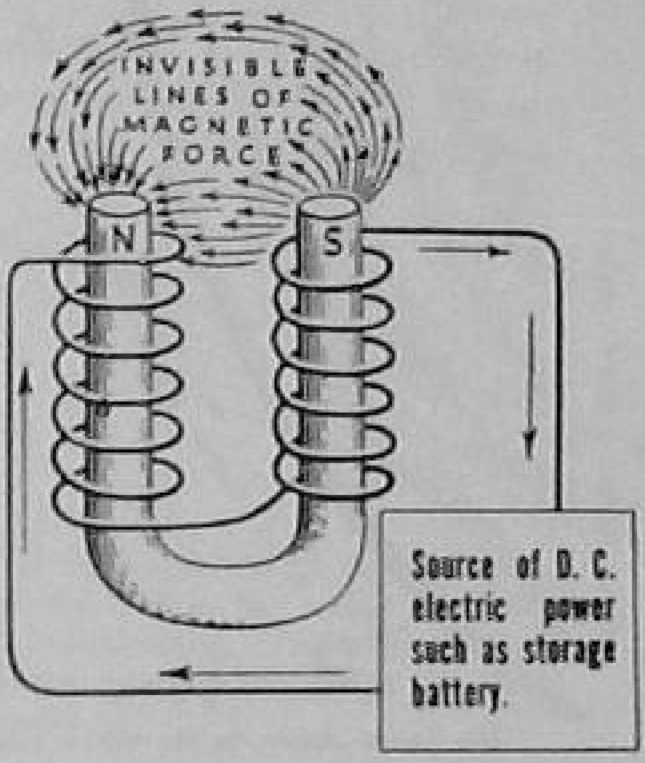
Literature. Leading actors have made records of great drama, and these recordings are part of the recorded literature of present day



Mechanical types of recording.

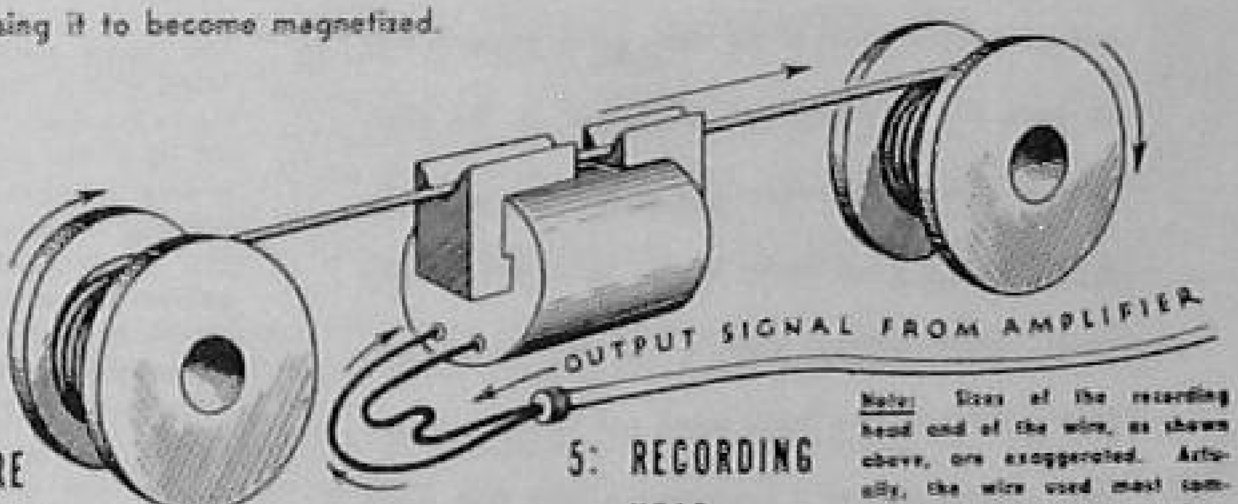
MAGNETIC TYPES OF RECORDING

Magnetic recording starts, just like mechanical types of recording, with (1) a SOUND SOURCE (left), from which (2) AIR-PRESSURE WAVES are "picked up" by (3) a MICROPHONE, which converts their energy into electric currents having the same pitch and volume characteristics, and feeds these (the "input signal") into an (4) AUDIO AMPLIFIER, which builds up their energy level. Here, the similarity ends.

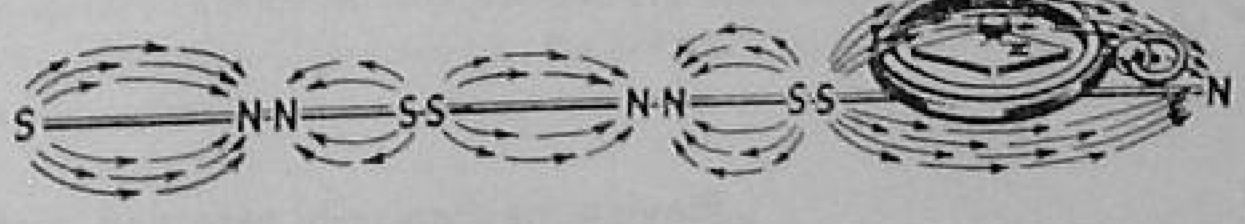


The magnetic sound-recording process is based on the operating principle of the "electro-magnet", wherein an iron "core" surrounded by coils of wire becomes magnetized when (and only so long as) an electric current flows through the coils. As indicated in the accompanying illustration, when an electric current flows through the coils of an electro-magnet, one of its "poles" (the two ends of the iron "core" marked "N" and "S" respectively) becomes a "north magnetic pole" and the other a "south magnetic pole", and there exists, in the "gap" (the space between the two poles), a "magnetic field" consisting of invisible "lines of magnetic force". In order to understand the magnetic sound-recording process clearly, two facts about the operation of the electro-magnet should be kept in mind. First, if the direction of the electric current in the coils is reversed, the direction of the lines of magnetic force across the gap of the magnet (i.e.—the magnetic field) will be reversed, also. Second, if a piece of steel is laid across the gap of the magnet, the lines of magnetic force will flow through the piece of steel, causing it to become magnetized.

In the case of the magnetic sound recorder, the recording head is an electro-magnet with its "pole pieces" facing each other.



In magnetic wire recording, the output signal from the audio amplifier flows through the coils of the electro-magnet recording head, generating lines of magnetic force across the gap between its pole pieces. With the steel recording wire in place, as shown above, most of these lines of magnetic force will flow through the wire, causing it to become magnetized. However, this output signal is not a steady current flowing only in one direction. Instead, it changes in direction and in intensity, many times each second, according to the variations (i.e.—"modulations") of the input signal that is fed into the audio amplifier by the microphone. This means that there will be a corresponding succession of changes in the direction and intensity in the lines of magnetic force across the gap between the pole pieces of the head. As the steel magnetic-recorder wire, travelling in the direction shown at the rate of about two feet per second, slides across this gap in the recording head, it takes a succession of corresponding magnetic fields. No observable change in the physical appearance of the wire takes place when a program is recorded on it. None of the material is taken off, and none is added. Its physical dimensions remain the same. The only difference is that, after a program has been recorded upon the wire, a succession of magnetic fields exist through its length, differing from one another in (1) length, (2) direction of polarity, and (3) intensity. This same process is employed as the basis of another type of magnetic recording, magnetic tape recording. Here, instead of recording on steel wire, the magnetic fields that comprise the "sound pattern" are established on flat paper or plastic tape (usually, about 3/8 inch wide) which either contains, or is coated with, very fine steel particles. The actual principles involved are the same as those described above.

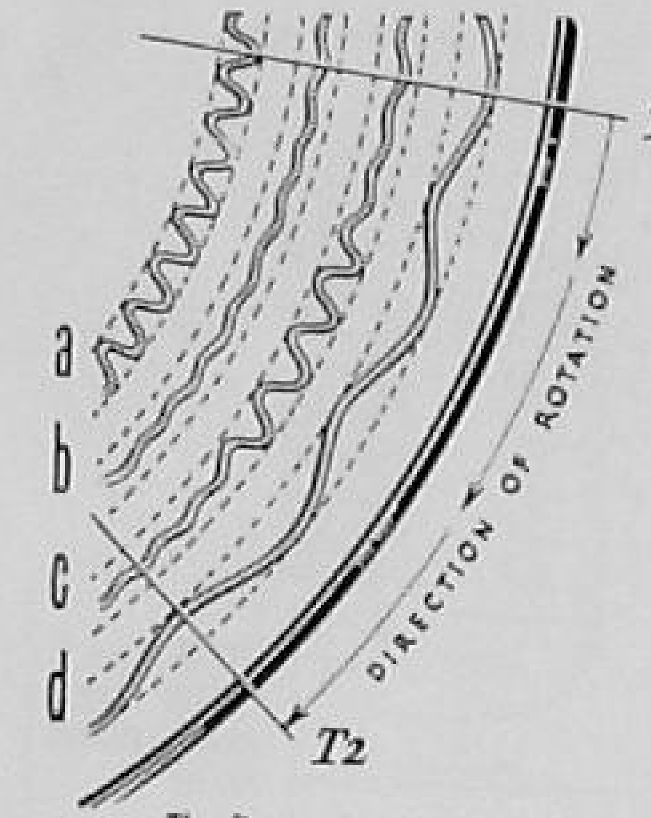


Magnetic types of recording.

PLAYING MECHANICALLY-RECORDED PROGRAMS

playing back the recordings:

1: THE SOUND PATTERN

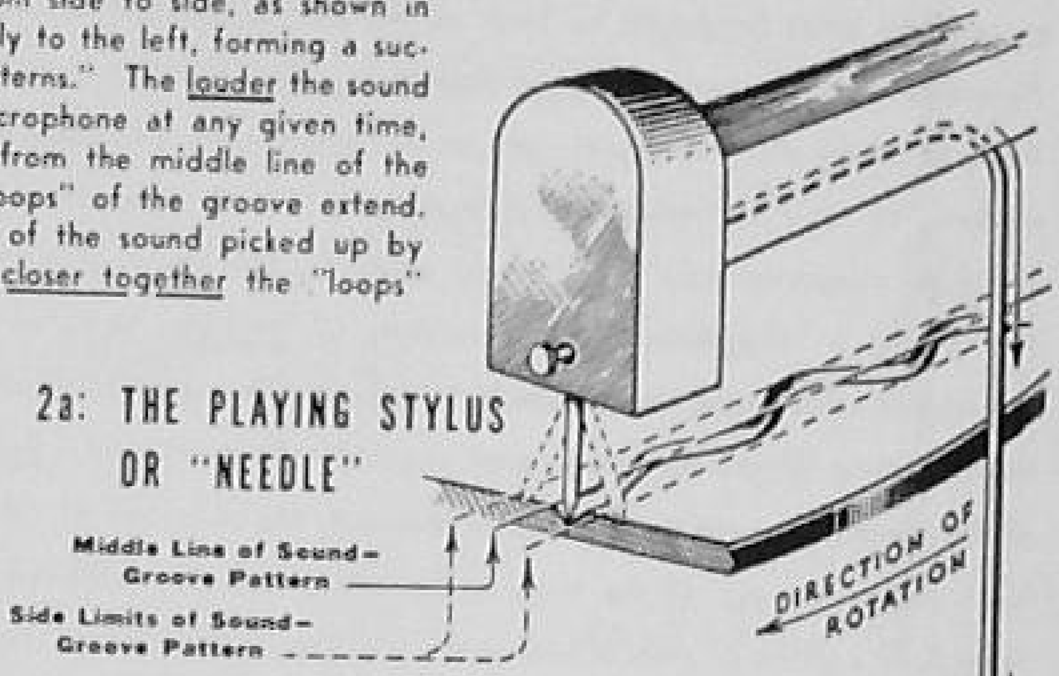


In disc-type recordings, made either by the engraving or by the embossing process, the "sound groove" is a continuous spiral which fills most of the space between the outer edge of the disc and the label space in the center. This sound groove is not uniformly curved throughout its length. Instead, it swings from side to side, as shown in the figure immediately to the left, forming a succession of "sound patterns." The louder the sound picked up by the microphone at any given time, the farther outward from the middle line of the sound pattern the "loops" of the groove extend. The higher the pitch of the sound picked up by the microphone, the closer together the "loops" are.

The figure above, to the left, is intended to represent four "sound patterns" as they might appear if the groove were highly magnified. Sound patterns a, b, and c represent tones of the same pitch, because they all have the same number of "loops" in the time-interval distance between radius T_1 and radius T_2. Sound pattern d has fewer "loops", so its pitch will be lower. Sound patterns a and d represent louder tones than b, because the loops curve out further on each side. Sound pattern c represents a tone that varies in loudness.

2: THE "PICKUP" OR PLAYING HEAD

2a: THE PLAYING STYLUS OR "NEEDLE"

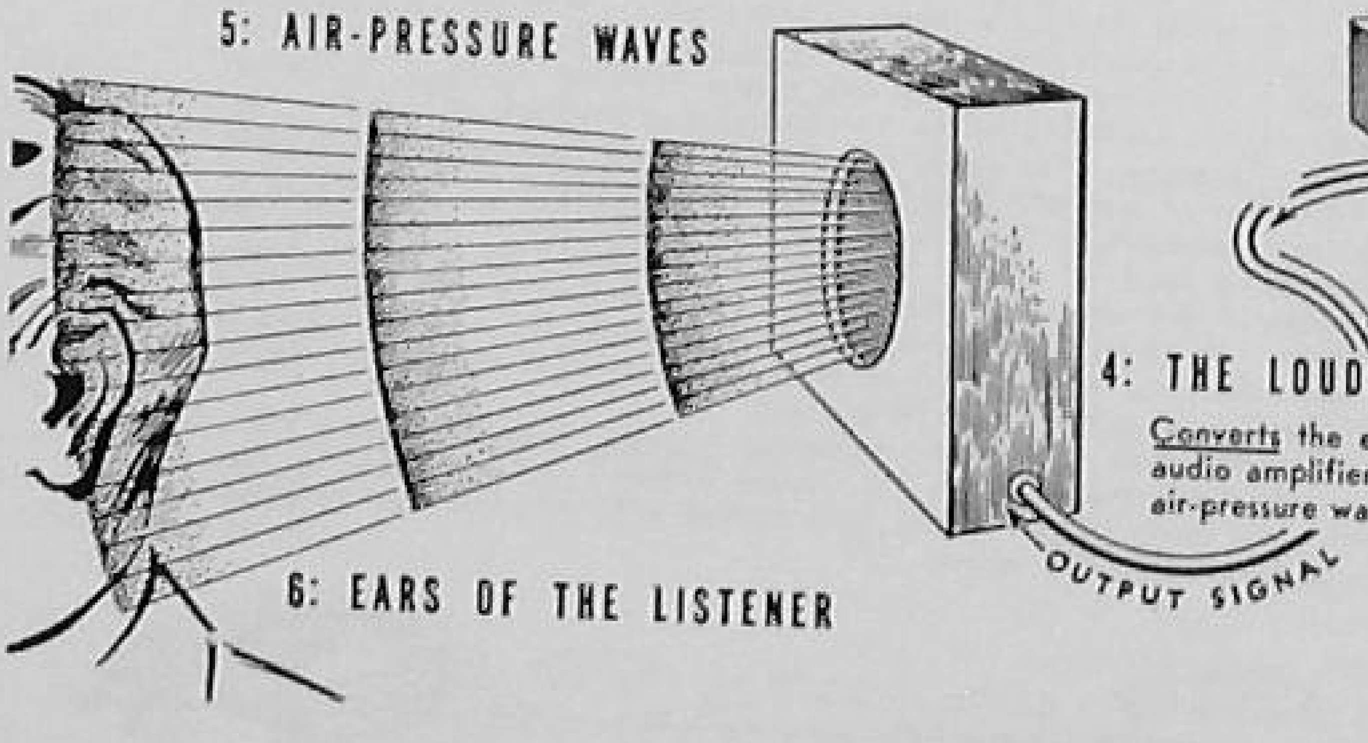


The figure above shows a "pickup" or playing head fitted with a playing stylus or "needle" with its tip resting in the sound groove of a disc. As the disc is rotated, the tip of the stylus, as it follows the pattern of the sound groove, is moved from side to side. The playing head converts this mechanical movement into electric currents (the "input signal") which vary according to the sound pattern traced by the stylus.
Exactly the same principles involved in playing mechanically-recorded discs are employed in playing programs that are recorded mechanically on plastic tape.

3: AUDIO AMPLIFIER

Builds up energy level of the "input signal" fed into it from the pickup or playing head.

5: AIR-PRESSURE WAVES



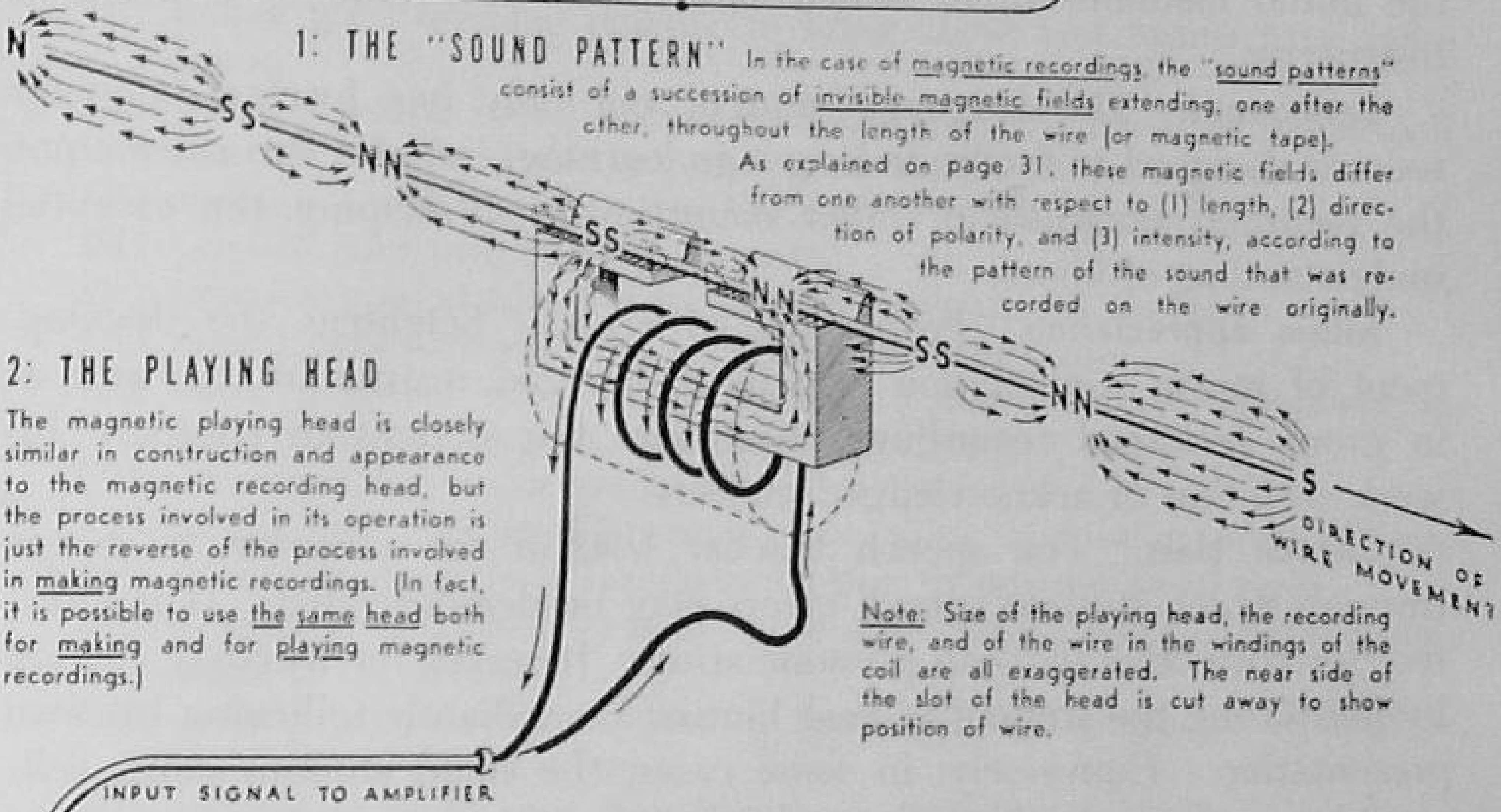
4: THE LOUDSPEAKER

Converts the electric currents of the audio amplifier's "output signal" into air-pressure waves that can be heard.

6: EARS OF THE LISTENER

Playing mechanically recorded pictures.

PLAYING MAGNETICALLY-RECORDED PROGRAMS



1: THE "SOUND PATTERN"

In the case of magnetic recordings, the "sound patterns" consist of a succession of invisible magnetic fields extending, one after the other, throughout the length of the wire (or magnetic tape).

As explained on page 31, these magnetic fields differ from one another with respect to (1) length, (2) direction of polarity, and (3) intensity, according to the pattern of the sound that was recorded on the wire originally.

2: THE PLAYING HEAD

The magnetic playing head is closely similar in construction and appearance to the magnetic recording head, but the process involved in its operation is just the reverse of the process involved in making magnetic recordings. (In fact, it is possible to use the same head both for making and for playing magnetic recordings.)

Note: Size of the playing head, the recording wire, and of the wire in the windings of the coil are all exaggerated. The near side of the slot of the head is cut away to show position of wire.

Note, in the accompanying figure, that there are seven magnetic fields in the length of recording wire shown lying along the slot of the playing head. Note, also, that each of these magnetic fields has two poles, a north magnetic pole (N) and a south magnetic pole (S), and that invisible lines of magnetic force (shown as lighter arrows) are assumed, in each case, to "flow" from the south pole to the north pole. In examining the magnetic field which lies immediately across he gap of the playing head, it will be seen that only part of the lines of magnetic force extend out into the space surrounding the recording wire. Instead, most of them "flow" through the iron "core" of the head, as indicated by the wavy arrows. This "induces" an electric current in the windings of the coil as the recording wire is moved.

As each successive magnetic field passes across this gap, the direction of the lines of magnetic force through the core of the head is reversed, causing the "induced" current in the windings of the coil to change direction, also.

Thus, as the recording wire is drawn along the slot of the playing head, a succession of electric currents is generated in the coil, differing from one another with respect to (1) direction, (2) duration, and (3) intensity. These constitute the "input signal" to the audio amplifier.

From here on, the process of playing magnetically-recorded programs is much the same as that of playing mechanically-recorded programs. The (3) AUDIO AMPLIFIER builds up the energy level of the "input signal" fed into it from the playing head, and feeds the resulting "output signal" into (4) a LOUDSPEAKER, which converts these amplified electric currents into (5) AIR-PRESSURE WAVES that register on (6) the EARS OF THE LISTENER as sound.

No comparison of mechanical and magnetic types of recording would be complete without some mention of a feature unique to magnetic recording, namely, that of being able, at will, to erase, magnetically, any recorded program (or portion of a program), and to record a new program on the same spool of wire (or to substitute a correction at any point in the program previously recorded). Most magnetic recorders have a special "BIAS-ERASE" head, which is located just ahead of the recording head, and which operates on much the same principle. To erase a program (or any portion of a program), a very high frequency current is fed into the "BIAS-ERASE" head which simply "cancels" the magnetic "sound pattern" originally recorded.

Playing magnetically recorded pictures.

studies. Poets have recorded their own works, giving them the authority of their own interpretation. Capable performers have made records of famous children's stories and of new stories especially prepared for the audio medium—all of which can be used effectively in classroom instruction.

Languages. The language student not only has foreign language records designed to facilitate language learning, but also can draw upon the recorded literature of other countries in developing the essential understanding of idiom.

Music appreciation. Proper use of records heightens the development of music appreciation. In individualized instruction, as well as in group rehearsal recordings, it enables the student to compare his work with that of acknowledged masters.

Speech class. The speech teacher has, in the recorder, a device through which student speech errors may be demonstrated. It is effective for corrective work in pronunciation. It serves for teaching diction by permitting the student to hear himself immediately following his own presentation. Conversely, in some cases, the timid student gains self-confidence through the revelation of his unsuspected effectiveness of presentation, enunciation, or tone quality. Finally, the link between the home and the school may be strengthened by giving the student "take-home" examples of his work so that the family may participate in appraisal of accomplishment. Recordings can be used both for parental critique and as a record of progress.

Dramatics. The dramatics teacher and the radio workshop director each make valuable use of the sound recorder in voice testing and voice analysis, in recording samples of student performance, sound effects, and music for general use or special performances.

Music. Many music teachers regularly record the work of students so that progress may be demonstrated. Recorders are used to identify mistakes not caught by the student's ear, and to help the student develop better techniques of performances and interpretation. These purposes can be readily accomplished through self-criticism.

The playback equipment, of course, makes an essential contribution in each of these fields of study by reproducing school-recorded materials. In addition, a wide variety of commercially produced records and transcriptions is available to the schools having facilities for reproducing them.

DO's for Using Radio, Recording, and Playback Equipment

DO use the radio in the classroom for a more dynamic lesson.
DO ask your local radio station for advance information concerning broadcasts.
DO select a program that fits the lesson.
DO cooperate with local radio stations in preparing educational broadcasts.

DO illustrate the radio lesson with pertinent visual aids.
DO utilize local school-of-the-air programs.
DO secure all available teaching aids to help prepare lesson.
DO make classroom and radio ready before lesson starts.
DO follow good teaching practice to bring about best results from radio lesson.
DO select a central sound system that will meet the needs of the school.
DO select a reliable dealer to install your central sound system.
DO arrange a daily schedule for the central sound system.
DO prepare your own radio programs.
DO practice presentation before putting program on the air.
DO record out-of-school-hours programs for future use.
DO make a special effort to use recording and playback equipment in speech, music, English, and language classes.
DO secure catalogues for available recordings.
DO record and play back student plays, talks, and other presentations.
DO store recordings in a satisfactory place to prevent breakage.
DO coordinate and carefully plan to use all recording and playback equipment in the school.
DO make provisions for connecting recording and playback equipment with central sound system.
DO attempt to build your own library of recordings.
DO select the recording medium (disc, wire, tape) that will best suit your purpose.
DO practice with recording and playback equipment before using in the classroom.

Central Sound System

Once you use a central sound system, you wonder how you ever got along without it. A central sound system provides a means for instant contact with every classroom. You can announce numerous school details, and transmit radio broadcasts, recordings, programs from other classrooms and assemblies to all parts of the building. All this is possible with a central sound system. Most new school buildings have provisions for an audio system of this nature. Many of the older buildings are installing sound systems.

Types of central sound systems. A central sound system includes a microphone, an amplifier, a central control board, wiring to classrooms, and a speaker in each room. The control board is centrally located and should be placed near the persons who will use it most frequently—the audio-visual education director, or the audio-visual aid coordinator for the school.

There are numerous types of school sound systems. A radio may be built in or attached to the control board and provision made for playing records manually or automatically. These records may be ten- or twelve-inch records which revolve 78 revolutions per minute, and play three to five minutes on each side, or sixteen-inch recordings that turn 33⅓ revolutions per minute, playing approximately fifteen minutes on

Courtesy David Bogen Co., New York.

An effective central sound-system control unit for two-way communication with built-in radio and record player.

each side. It is also possible to use a Long Play 33⅓ RPM record, which plays about twenty-five minutes on each side. Microphones may be attached to the system in classrooms and other parts of the building, to pick up programs originating in these locations.

There are other arrangements such as these:

1. *One-way communication.* This provides for simultaneous communication from the central switchboard to all classrooms. It does not provide selectivity and can be used only for general announcements of interest to all students. It may be used with bells to indicate change of period or as a fire alarm; but on the whole its value as a teaching aid is limited.

2. *Selective communication.* This system permits contact with individual classrooms. If necessary, all rooms may communicate simultaneously. This is obviously more effective than a one-way system because a specific classroom may be selected without disturbing other rooms. It may also be used for general announcements, change of periods, and fire drill signals.

3. *Two-way communication.* A two-way system permits communication with individual classrooms, but it is also possible for the individual classroom to communicate with the office or the central switchboard room. The speaker in the classroom also serves as a microphone to pick up the sound in the room and transmit it to the central switchboard room.

If the communication originates in the classroom, the teacher signals by a simple switch, which registers on the central switchboard, and contact is made between classroom and office.

4. *Radio, record players, and recording units.* If these are not already incorporated in the audio system, it is usually possible to have them attached. They greatly increase the value of your audio system, as selected radio programs and record selections may be sent to the classrooms. A recording unit would make it possible to record programs originating in the school; it may also record a specific radio program and then play it back when the class needs it.

5. *Playground, gymnasium, and auditorium facilities.* In larger schools it is advisable to set up separate sound systems (public address systems) in the playground, gymnasium, and auditorium. In this event, the local system should be connected with the central sound system so that programs originating at the central switchboard may also be heard in these rooms. But, many factors must be taken into consideration in a system of this nature, and it is highly advisable to seek the advice of your local central sound system expert in planning.

6. *Remote pickup facilities.* Remote pickup facilities provide for microphones in the rooms in which programs originate, to be sent to other rooms. In the ordinary two-way communication system the loudspeaker also acts as the microphone; but due to the location and nature of the speaker it is not as effective as a separate microphone. A remote pickup facility also permits sending a program from one room to other parts of the school without disturbing the office.

7. *Channels and wiring.* The number of rooms in the school, the layout of the building, the needs and purposes of the audio system, and the amount of money available are important factors when determining channels and wiring plans. Some central sound systems have provisions for sending different programs to different classrooms at the same time without interfering with each other. For example, a program might be going in one or two social study rooms, a record player might be sending a program to the music room, and a microphone might be used for announcements to a group in the auditorium—all this without any interference.

Experiments are now going on with central sound systems that do away with wiring between the control panel and the speakers in the

classrooms. It involves the same principle as in broadcasting—only a smaller transmitter is used. When this is perfected and an operating policy is established by the Federal Communications Commission, this type of central sound system should become more prevalent. It would considerably reduce installation cost and thereby meet the requirements of a large number of schools.

Sources of equipment and installation. Schools that attempt to install their own central sound systems, with students from vocational classes and electrical shops, meet with varied experiences. In some cases, if the instructor is experienced in this field and closely supervises the work of the students, the finished job is satisfactory. Otherwise the central sound system may be a continual source of trouble and require an expert to repair or do the job over again. The most satisfactory results are generally obtained with central sound systems that have been installed by a local representative of the manufacturer. Following is a partial list of companies manufacturing central sound equipment, who will supply all data concerning your specific problem:

PARTIAL LIST OF MANUFACTURERS OF RECORDING AND ASSOCIATED EQUIPMENT

Acoustic Consultants, Inc.,[2] 1270 Sixth Avenue, Rockefeller Center, New York, N. Y.
H. W. Acton Company, Inc.,[4] 370 Seventh Avenue, New York, N. Y.
Allied Recording Company,[1] 126 West 46th Street, New York, N. Y.
Audak Company, Inc.,[5] 500 Fifth Avenue, New York, N. Y.
Audio Devices, Inc.,[3] 1600 Broadway, New York, N. Y.
Bell Telephone Laboratories, Inc.,[2] 463 West Street, New York, N. Y.
David Bogen Company, Inc.,[1] 663 Broadway, New York, N. Y.
Bruno Laboratories, Inc.,[1] 30 West 46th Street, New York, N. Y.
Brush Development Company, The,[2, 5] 3311-25 Perkins Avenue, Cleveland, Ohio.
Capps, Frank L.,[4] 244 West 49th Street, New York, N. Y.
Cellutone Record and Manufacturing Company,[1] 1135 West 42nd Street, Los Angeles, Calif.
Columbia Transcription Service,[3] 1776 Broadway, New York, N. Y.
Fairchild Aerial Camera Corporation,[1] 88-06 Van Wyck Boulevard, Jamaica, N. Y.
Federal Recorder Company, Inc.,[1] 50 West 57th Street, New York, N. Y.
Gray Manufacturing Company,[6] Hartford, Conn.
Lansing Manufacturing Company,[8] 6900 McKinley Avenue, Hollywood, Calif.
Miles Reproducer Company, Inc.,[6] 812 Broadway, New York, N. Y.
Miller Broadcasting System, Inc.,[7] 113 West 57th Street, New York, N. Y.
Mirror Record Corporation,[3] 58 West 15th Street, New York, N. Y.
Presto Recording Corporation,[1] 242 West 55th Street, New York, N. Y.
Radiotone, Inc.,[1] 7356 Melrose Avenue, Hollywood, Calif.
Rangertone, Inc.,[3, 4] 201 Verona Avenue, Newark, N. J.

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[1] Disc recording equipment, records, and accessories.
[2] Magnetic tape recorders.
[3] Records and accessories.
[4] Cutting and playback needles.
[5] Cutting heads and pickups.
[6] Embossing on disc or tape recorders.
[7] Engraving on tape recorders.
[8] Loudspeakers and pickups.

R C A Manufacturing Company, Inc.,[1, 6] Camden, N. J.
Sound Apparatus Company,[1] 150 West 46th Street, New York, N. Y.
Sound Specialties Company,[1] 31 Beckley Avenue, Stamford, Conn.
Speak-O-Phone Recording and Equipment Company,[1] 23 West 60th Street, New York, N. Y.
Universal Microphone Company, Ltd.,[1] Inglewood, Calif.
Vibro-Master Company,[1] 2744 Broadway, New York, N. Y.
Wilcox-Gay Corporation,[1] Charlotte, Mich.

Uses of central sound systems. Besides the many administrative and supervisory uses of a central sound system, it may be used to improve instruction in subjects on elementary, secondary, and college levels. English, social studies, history, geography, economics, science, health, physical education, and music may be made more effective by having appropriate radio programs "piped" into these classrooms. Classes in French, Italian, German, Spanish, and other foreign languages can draw upon ample material from local broadcasts in foreign languages. Short wave broadcasts may bring programs right into the classroom from foreign countries. Some enterprising business education teachers use radio speeches sent into the classroom as a source of dictation in secretarial classes. This not only builds speed but also enables shorthand students to become accustomed to taking dictation from different people. Recently an art supervisor broadcast an art lesson to all elementary schools in the county with such great success that plans were made for other similar programs. With the increase of planned educational programs, F.M. broadcasts, and the more intensive use of recording and playback equipment, the central sound system will become an essential teaching aid in all schools.

The following program logs illustrate how central sound systems are being used. They are selected from the files of schools that make full use of their audio equipment.

Elementary School No. 1

From	To	Audio Activity	Sent To
A M			
8:25	8:30	Soft music (recorded)	All rooms
8:30	8:35	Principal's and student announcements	All rooms
9:00	9:15	"Radio Arithmetic Practice" problems broadcast (Sent from main office studio by 6th grade student)	Grades 5 & 6
9:15	9:30	Radio broadcast "Morning games for children"	Grades 1 & 2
9:30	10:00	Portable phono-player used to teach Music Appreciation	Grade 4
10:15	10:30	Portable phono-player used to teach Music Appreciation	Grade 3
10:30	10:45	"Broadcast" by selected English students from main office studio of class-written play-script	Grade 6
11:00	11:15	Radio broadcast "School of the Air"—Safety	Grade 3
11:15	11:30	Dismissal music	Grade 1
11:20	11:25	Dismissal music	Grades 2 & 3
P M			
1:00	1:15	Radio broadcast "Story Time"	Grades 1 & 2
1:45	2:00	Radio broadcast "Ohio Heroes"	Grade 6
2:15	2:30	Transcription "The Quiz Kids" on Health Day	Grades 4 & 5
2:45	3:00	Portable phono-player used to teach Music Appreciation	Grade 5
3:15	3:20	Dismissal music	Grade 1
3:20	3:25	Dismissal music	Grade 2
3:25	3:30	Dismissal music	Grade 3
Evening			
7:30	8:30	P.T.A. Meeting: Children's broadcast by local children in main office studio	All rooms

High School No. 2

From	To	Audio Activity	Sent To
A M			
8:25	8:30	Recorded soft organ music played	All rooms
8:30	8:35	Announcements: Student M. C. and Student Announcers Day's special events, results of contests Principal's announcement	All rooms
8:35	8:45	Short Address: Visiting Alumnus, from Principal's Office	All rooms
8:45	9:00	Transcription: Episode in Life of Lincoln	Amer. Hist. Class
9:05	9:30	Transcription: Radio class practice recorded previous day	Radio Class
9:05	9:20	Radio program, Ohio State University	Biology Class
9:30	10:00	Recording: Student voices speech studio	
9:30	10:00	Portable phono-turntable used in French class	
10:00	10:30	"Broadcast" of Eng. 10 "English Usage" script	English 9-11 Classes
10:30	10:45	Radio Newscast "broadcast" and recorded simultaneously	World Prob. Sec. I
11:00	11:15	Radio Newscast (transcription of previous broadcast)	World Prob. Sec. II
12:15	12:45	Phono-music records played for noonday dance	Gymnasium
P M			
1:15	1:45	Recording: Chorus in Music Department broadcast practice	
1:15	1:30	Radio Newscast (transcription of previous broadcast)	World Problems Sec. III
1:30	1:45	Round Table discussion in Speech class	English 12 class
1:45	2:00	Transcription: "The Constitutional Convention"	Social Sc. Class 8
1:45	2:00	Portable phono-turntable used in Spanish class	
2:00	2:30	Radio class practice in Radio Workshop, separate amplifier	Workshop
2:15	3:00	Speech class voices recorded: Speaking choir	
2:30	3:00	Verdi's Requiem Mass "broadcast" for choir listening	A Capella Choir
3:00	3:45	Recording & Broadcasting simultaneously: Joint special drama-music program from Orchestra-room, Radio-workshop and announcing studio, mixed at central control panel	All rooms
6:00	6:15	Recording: Newscast for use in Social Science tomorrow or later	

High School No. 3

From	To	Audio Activity	Sent To
A M			
8:25	8:30	Principal's announcements	All Rooms
		Student announcements, results of Red Cross drive, etc.	
8:30	9:15	Transcriptions in classrooms (portable players)	
		"The Aztecs" Latin American History class	Room 28
		"Oliver Wendell Holmes" English class	Room 20
		"Basic Radio Code" Radio Engineers club	Studio
8:45	9:00	Pupil broadcast over local radio station	Local Station
		A Capella Choir (pupil engineers)	
9:00	9:15	Program played back to the A Capella Choir	Studio
9:15	10:00	Speech Class use auditorium sound system	Auditorium
		"Dubbing" transcriptions by pupil assistants in studio control room	
9:45	9:46	Announcement by Principal (Band practice at the Stadium cancelled due to rain)	All Rooms
10:45	11:20	Transcription to History classes	4 Rooms
P M			
12:00	12:30	Music to gym. Noonday dancing	Gym
		Noonday music in auditorium (Recorded music over auditorium sound system, portable turntable)	Auditorium
12:45	1:30	Voice recordings by pupils in co-op Office Training class	Studio
1:45	2:00	Program transcribed from the "air" "Footnote People." (Transcription filed in Transcription Library)	
2:15	2:30	Broadcast (by transcription from School studio) over local broadcasting station. Conservation program.	Local Station
		12 Grade Schools listening-in	12 Schools
2:15	2:45	Special radio broadcast to Schools (Network) "Millions Facing Starvation"	All Rooms
3:00	3:40	Rehearsal (in studio) for broadcast	
3:20	3:30	Record typing room sound effects (To be used later in broadcast) portable recorder	
9:00	9:30	Record President's speech from network	

Charts 1, 2, and 3 courtesy of Radio Manufacturers' Association, Washington, D. C.

QUESTIONS

1. What are the sources for educational radio programs of a general nature?
2. What schools, colleges, and universities are conducting radio programs?
3. What factors determine the use of radio programs in the classroom?
4. What is included in the "how to get ready" step in preparing to use the radio in the classroom?
5. What physical aspects of the classroom should be checked before using the radio as an instructional aid?
6. Why is it important to acquire and study all advance information and to carefully plan the lesson before the radio presentation?
7. How would you arouse student interest prior to a broadcast?
8. How would you present a radio broadcast?
9. How would you discuss a radio broadcast?
10. How would you check student understanding of a radio program?
11. What is the central sound system?
12. What are the advantages of a central sound system?
13. What types of central sound system are available?
14. What additional wiring combinations are available?
15. In what ways may a central sound system be used?
16. What are the references mentioned in the text that would help you to prepare good radio programs for classroom use?
17. How would you proceed to prepare a script for a dramatic radio program?
18. What are the advantages of recording educational radio programs and playing them back in the classroom?
19. What are the sources for educational recordings?
20. What are the chief types of recording and playback equipment?
21. What is a recording disc?
22. Who are some of the manufacturers of disc recorders and playback equipment?
23. What is a wire recorder?
24. What are the names of some of the wire recorders and who are their manufacturers?
25. What is a tape recorder?
26. What are the names of some of the tape recorders and who are their manufacturers?
27. What are the factors related to recording and playback equipment that should be considered before a purchase is made?
28. How are mechanical recordings made?
29. How are magnetic recordings made?
30. Who should determine the specific use of recordings and playback equipment?

PROBLEMS AND PROJECTS

1. Prepare a list of the radio programs that may be considered educational. Cover a period of one week. Group your references or sources according to the subject matter mentioned in the text.
2. What instructional steps should be observed in using practically all types of radio programs in the classroom? Give details.
3. Investigate the activities of colleges and universities that broadcast

educational programs. How many are planning to do so? What types of programs are being broadcast?

4. Prepare an instructional plan (also called "lesson" and "operating sheet") for teaching a topic through the medium of radio. Include in the plan all of the methods and techniques that are included in the Chapter 17—"Personalized Audio-Visual Instruction." Indicate in your plan how you would (a) choose your radio; (b) secure advance notice of the radio program; (c) secure advance information of the content of the radio programs; (d) arrange the physical aspects of the room; (e) arouse student interest; (f) present the broadcast; (g) discuss or apply the information given in the broadcast; (h) check student understanding of the program.

5. Prepare a memorandum, or report, for your administrator or manager, related to the installation and use of a central sound system. Include the following items in this paper:

a. Types of central sound systems, including the various wiring combinations.
b. Sources of equipment and installation.
c. Uses of central sound systems.
d. Advantages and disadvantages.
e. Cost of installation and maintenance.

6. Plan a broadcast for educational appeal. Follow these suggestions:

a. Choose a suitable subject.
b. Choose the type of program suitable for your subject.
c. Prepare a script that will serve to convey your idea to your audience.
d. Plan your script for a 10-minute broadcast.

7. Prepare a "request for equipment purchase," addressed to your administrator or manager, in which you ask for recording and playback equipment for educational use. In your request stress the following points:

a. Need for this kind of equipment.
b. Advantages of this kind of equipment.
c. Sources of educational recordings.
d. Kinds and nature of recordings.
e. Types of recording and playback equipment.
f. Your choice and reasons therefor.
g. Manufacturers of recording and playback equipment.
h. How you would use this equipment in an educational situation.
i. Approximate cost of installation and maintenance.

Courtesy of CBS Television Station WCBW, New York.

Broadcasting a how-to-do-it type television program.

Television

Television has swept the nation. Approximately 400 stations in major cities between New York and Los Angeles are telecasting programs to more than 60 per cent of American homes. Several hundred applications for television stations are still pending with the Federal Communications Commission and television manufacturers are now focusing their attention on the production of color sets.[1]

At first, television networks extended from New York east to Boston, west to Pittsburgh, north to Buffalo and Schenectady, and south to Richmond, Washington, Baltimore and Philadelphia. Chicago, Milwaukee, Detroit, St. Louis, Toledo, and other midwest cities were planning to join this network. On the west coast, a television network extended between Los Angeles and San Francisco and Portland and Seattle were making plans to join the network. In the south, there were stations at Charlotte, Fort Worth, Houston, and New Orleans, and a few other cities. Today a series of coaxial cables and relay towers for beaming television waves

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[1] On December 17, 1953, the Federal Communications Commission adopted new color transmission standards which were developed and advocated by industry through its National Television System Committee. The new standards are based on the "simultaneous" system, which transmits the three primary colors (red, green, and blue) at the same time. They are "compatible" in that they enable existing television sets to receive color programs in black and white.

virtually connect the entire country, thus literally bringing the world into the classroom.

Nature of Television Programs

Television program directors are constantly striving to improve their offerings. They work in close cooperation with engineers, who have developed such improvements as the "zoomar" lens, the "image orthicon," and the "electronic wipe."

The "zoomar" lens enables the operator instantly to switch from an average view of a scene to an extreme close-up view.

A new television camera, a hundred times more sensitive than before, called the "image orthicon" permits clear images even with adverse lighting conditions. It also reduces the need for huge batteries of lights, which produce an annoying glare and excessive heat.

The "electronic wipe" makes it possible to see more than one view on the screen at the same time. For example, a speaker in New York might be talking about an event in Washington and a scene from the floor of the House of Representatives appears on the television screen while the event is taking place. These are only some of the ways television may be used to help do a better teaching job.

Television Versatility

Television is without a doubt one of the most versatile audio-visual aids ever developed. Its ability to convey life and events in action will have a profound influence upon what teachers and students think and do in the future. It is natural, therefore, that many progressive educators are using and testing television as an educational tool. Others are interested and eager to begin, but hesitate because of the general lack of information about the use of television in the classroom.

Admittedly, this is still a new field. There is much to be done before television achieves its full usefulness in teaching. But along the path of discovery lie many rewards of accomplishment for those who seek and learn.

This chapter is intended to answer some pertinent questions relating to the use of television in schools, and to inspire active interest in helping to develop what may become one of the great teaching mediums.

The "eye- and ear-mindedness" of students makes television one of the most promising of present day educational forces. For television has been said to be "the blackboard dramatized, the picture brought to life."

It offers a vitality and newness which attracts attention, creates interest and stimulates a desire to learn. As Wayne Coy has stated in

Courtesy of General Electric Co.

Control room in studios of G-E television broadcasting station WRGB in Schenectady, N. Y. In the foreground is the program director; center, camera monitoring desk; and background, a view of part of the studio.

the *NEA Journal*, "television is the electronic blackboard of the future."

Commercial television can and does provide indelible impressions of classroom subjects in action, either as supplementary dramatizations or as up-to-the-minute presentations of information not ordinarily available to classroom audiences.

Commercial Television

While many communities prepare for and need educational programs, commercial television broadcasters are constantly experimenting with techniques and methods of presentation on a quasi-educational basis. Although programs are liberally sprinkled with mass-market selling devices skillfully woven into coverage of sport contests, general talks, entertainment and amusement, interviews, and spectacular current events, there appears to be a definite trend toward more newsreels, "how-to-do-it" programs, and full-length dramas.

Many of these programs are adaptable for use in the school program. Religious ceremonies, agricultural projects, and school pageants, for example, may also be used to illustrate specific phases of knowledge.

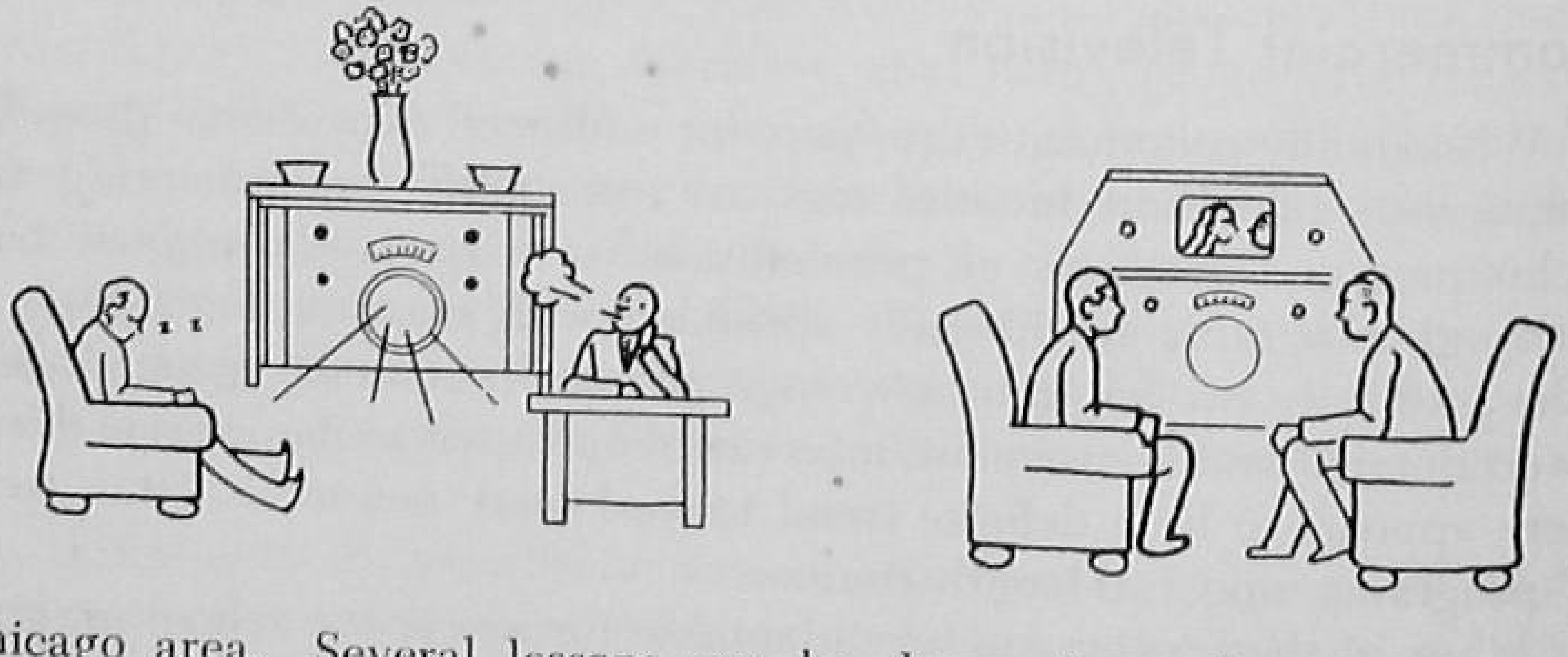
Almost all commercial "educational" programs are now controlled by privately owned TV stations. By the very nature of their dependence on mass markets for support, commercial television stations must devote their time to mass selling, not to public education. Very few commercial stations can afford to give enough time to non-profit educational telecasts.

The result is the kind of dubious programs discovered by the citizens of Wilmette, Illinois.

A trained, organized group of thirty parents watched every children's program for a solid week and what they found out made news across the country. During the seven-day period the startled parents saw 77 murders, 53 shootings, 30 gunfights, 7 kidnappings, 59 fist fights, 2 knifings, 22 sluggings, 3 whiplashings, 2 poisonings, 2 bombings, 3 murders by poison darts, a man hit over the head with a shovel and another killed by a train, an attempted lynching, a man clawed by a tiger, a suicide, a girl locked in a vault, a boy beaten by his uncle, a man thrown over a cliff, three men locked in a safe, and a man blown up in an ammunition dump. This grisly catalogue of plain and fancy crime included only violence wreaked on individuals without counting mass deaths such as the burning of a native village, a falling dirigible and a ship fire. At this rate the annual fare of blood and thunder dished out to children by four stations would add up to thousands of murders and other crimes of violence.

When a columnist printed the Wilmette parents' findings across the front pages of a Chicago newspaper, people began to sit up and take notice. And in Wilmette it was decided that the time had come to act. A village committee was organized, funds were collected and the final result was the Chicago Educational Television Association, which was broadened to include seventeen different educational and cultural institutions.

All this could not have been done without the active and enthusiastic support of a large number of people and organizations throughout the



Chicago area. Several lessons can be drawn from the experience in Wilmette:

1. A few determined people by individual effort can do a great deal to stir even a large community into concerted civic action.
2. The general public definitely cares about the type and quality of television programs and will support an educational station once interest has been aroused.

Courtesy of National Citizen's Committee for Educational Television
(Black Star Photo by Maurice Miller)

"Great Books" program over KUHT at the University of Houston—the first educational TV station to go on the air in the U.S. (May 25, 1953)

3. Demonstrated enthusiasm in one community or section of a community has a contagious quality and spreads rapidly to adjacent communities.

Educational TV Stations

In more than a hundred communities of various sizes and scattered throughout the United States, citizens are planning and working to build television stations for educational purposes. These people are taking advantage of the reservation, made by the Federal Communications Commission in April 1952, of 242 TV channels, later increased to 252, for non-commercial educational use.

By the beginning of 1955, educational television stations were on the air in Ames, Iowa; Houston, Texas; Los Angeles, California; San Francisco, California; Pittsburgh, Pennsylvania; Cincinnati, Ohio; St. Louis, Missouri; Madison, Wisconsin; East Lansing, Michigan; and Lincoln, Nebraska. Nine other communities already had educational television stations under construction: Chapel Hill, North Carolina; Boston, Massachusetts; Columbus, Ohio; Champaign-Urbana, Illinois; Detroit, Michigan;

Seattle, Washington; Oklahoma City, Oklahoma; Tulsa, Oklahoma; and Mumford, Alabama.

Twelve communities had made substantial progress in their plans to build stations: Memphis, Tennessee; Chicago, Illinois; New Orleans, Louisiana; Athens, Georgia; Atlanta, Georgia; Denver, Colorado; Philadelphia, Pennsylvania; Cleveland, Ohio; Miami, Florida; Toledo, Ohio; Nashville, Tennessee; and Birmingham, Alabama. In addition, the Joint Committee on Educational Television [2] reports that "Educational forces in thirty-two communities have been working diligently to establish stations, with local committees at work from San Diego to New York City and Minneapolis to Tallahassee."

A special progress report submitted to the Federal Communications Commission by the Joint Committee on Educational Television at the close of the year 1954 concluded that "It is not unreasonable to predict that by early 1955 we will have seventeen educational television stations on the air, with their programs regularly available to about 25 million people; and by the end of 1955, about thirty such stations will be beaming signals to areas with a population of around 40 million residing in eighteen states."

Basic pattern for starting an educational TV station. Available data reveal that a basic pattern is emerging from experience throughout the country. Although local problems vary, those communities that have reached an advanced stage of planning for educational TV have found:

That initial non-recurring costs for construction and equipment usually can be covered by a combination of grants from national and local foundations, plus large gifts from corporations and individual donors.

That local commercial TV station officials will usually cooperate, make available an antenna without charge, offer engineering and technical advice, and sometimes make other substantial contributions.

That adequate studio space often is available in existing structures owned by educational or cultural institutions which will make them available without charge or at nominal rental.

That a small staff of paid or volunteer workers is essential in the early organizational stage; there is too much detail to rely on otherwise-occupied committee members.

That local school systems can find the means of financing programs specifically designed for in-school reception and that the per-viewer cost is very low (thirty cents per pupil per year in Pittsburgh, for example).

That people will enroll in formal TV courses for high school and college credit; that they will pay at least a nominal fee for printed materials to supplement the course; and that TV viewers do at least as well in examinations as campus students.

That the public will respond to a well-planned, well-organized, and well-publicized solicitation of funds, especially to finance adult programs.

That the broadest possible community representation on the sponsoring

[2] National Citizens Committee for Educational Television, Ring Building, Washington 6, D.C.

board or commission is not only good policy but a great stimulant to public support and a source of volunteer workers.

That active support from the local press is a highly desirable—even essential—ingredient of success.

That participation by many and varied population groups in programming suggestions and decisions stimulates interest and provides evidence that the station will serve the entire community.

That certain key jobs on the station's staff should be filled by experienced, professional TV technicians.[3]

Procedure for starting an educational TV station. The Federal Communications Commission stipulates that licenses for the educational television stations will be granted only to non-profit educational organizations. Stations can be built and operated by a single institution, or by a new non-profit organization especially formed for the purpose, but the requirement of the FCC is that all educational institutions in the area served by the station be given opportunity to participate.

The first step of citizens in any community interest in having an educational station is to inquire what their school board, college presidents, and other educators are doing to take advantage of this opportunity. In almost every case it will be found that some degree of activity is already underway. But the educators will welcome—indeed, usually have a great need for—just as wide a base of citizen support as they can rally. If civic leaders will undertake to generate public support and insure the funds necessary to get a station on the air, educators to whose care licenses are entrusted can concentrate on developing interesting and significant programs.

Various philanthropic foundations and business interests will usually help the educational television program advance. Therefore it is possible that in some instances outside funds will be available to assist in one aspect or another of getting a station started.

The National Citizens Committee for Educational Television works closely with the Joint Committee on Educational Television which is the central group of educators interested in this development. JCET offers help in engineering, legal, and programming aspects, as well as in applying for a license. The Citizens Committee has been formed to mobilize and accelerate public support and activity in every way possible, including suggestions on fund raising. Full information will be sent to interested parties on request by the National Citizens Committee.

National program center. Programs to maintain continuous and high level offerings will probably depend on the ease with which good programs can be exchanged among stations.

It may be possible to link up the nation's educational stations in a

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[3] National Citizens Committee for Educational Television, Ring Building, Washington 6, D.C., 1953.

formal exchange. However, even before that time, educational television stations can make good use of the many thousands of first-class educational films already available by circulating them. Television can give these films a distribution never possible when showings were limited to projectors, special rooms, and trained operators. Moreover, as good programs are developed by the individual stations, they can be put on film through the relatively inexpensive kinescope method. This makes a movie direct from the television screen.

Plans are already well advanced for the establishment of an Educational Television and Radio Center. It will operate under an initial grant from the Fund for Adult Education (an independent organization established by the Ford Foundation) and is expected to draw wide support. It will work in close cooperation with the new educational stations as they go on the air, and with the Joint Committee for Educational Television, as well as with the National Citizens Committee for Educational Television.

School-Televised Education

Many schools operate their own television stations, although such ventures may be too expensive for the average school or school system.

The U. S. Office of Education [4] states that currently "public schools report 37 direct teaching programs designed for in-school viewing and 30 such programs were reported by colleges and universities. Three city school systems reported experimental series designed to provide laboratory experiences for teachers and their pupils in determining the best uses of television programs as teaching aids. There are 15 so-called "telecourses" included in the report, some of which offer full college credit, others offering certification through extension divisions, and still others offering no credit but providing syllabi for course auditors."

The U. S. Office of Education [5] also reports that subjects covered among the direct-teaching programs by public and private schools include: science, social studies, literature, foreign languages, art appreciation, creative art expression, health education, safety education, vocational guidance, and social behavior. At the adult level, lecture subjects range from anthropology, adult psychology, child psychology, preventive medicine and health, science engineering, political science, history and geography, to public speaking, art appreciation, homemaking, consumer education, farm information, and news.

Closed circuit transmission. A more practical and perhaps a more economical approach to televised programs is to use the closed circuit

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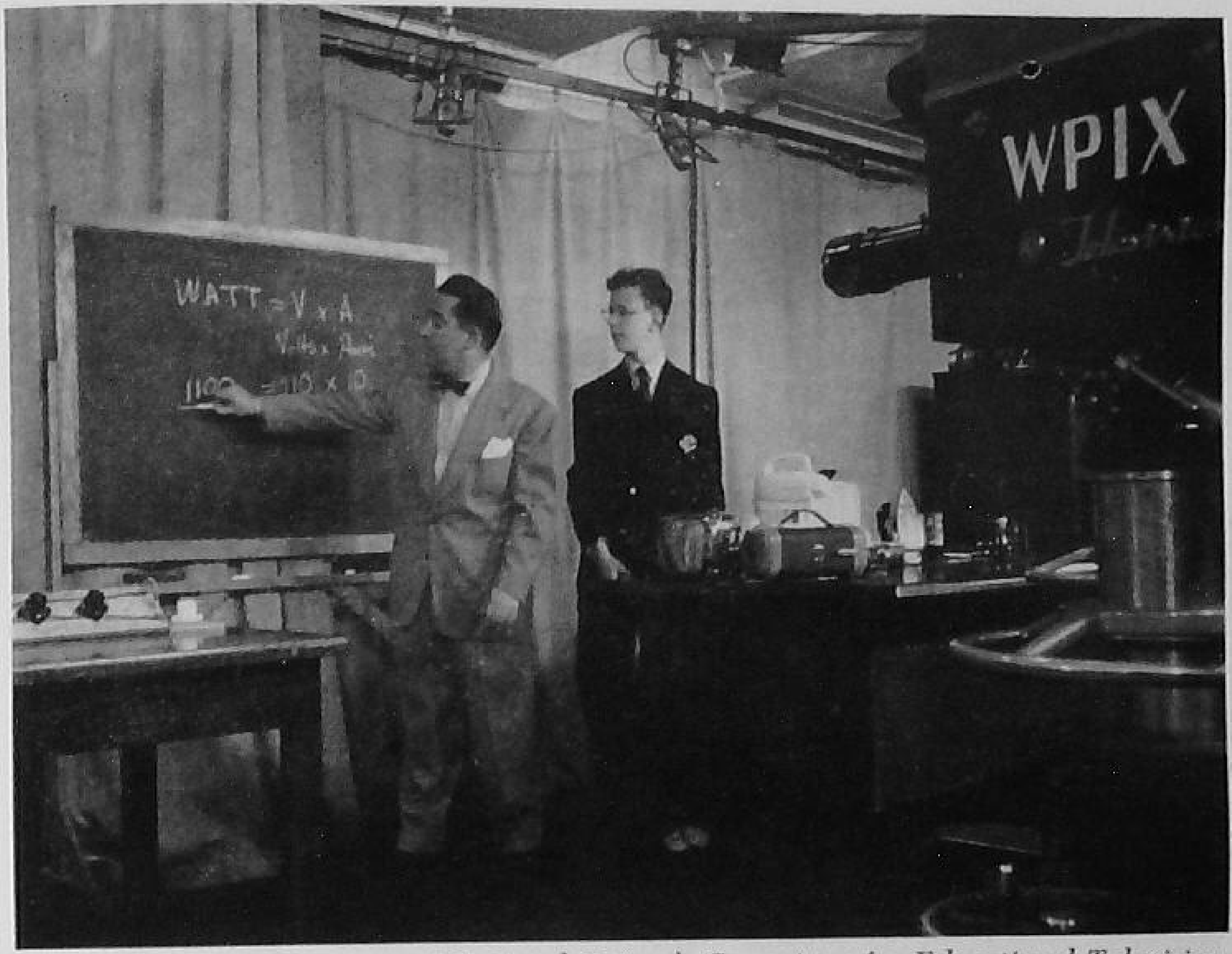
[4] *Educational Television*, U. S. Office of Education, Washington 25, D.C.
[5] *Ibid.*



Courtesy of National Citizen's Committee for Educational Television
(Black Star Photo by Werner Wolff)

"The Living Blackboard" program, Station WPIX, New York.

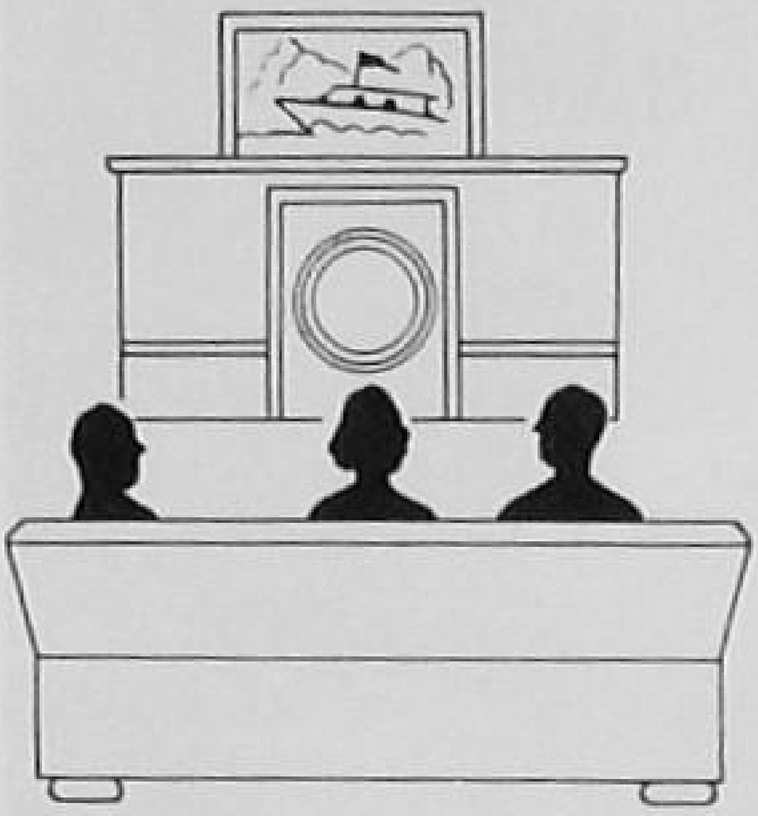
type of transmission. This permits complete control of broadcasts without the need of transmitter, antenna, or FCC license. Signals are fed by direct wire from studio camera to receivers, enabling a school to originate its own programs and transmit them to selected classrooms.

The majority of schools, however, will be limited to the contribution of teacher or pupil talent, teaching apparatus, and materials and assistance in planning and direction. These schools, cooperating with local television stations, will find it possible to utilize existing facilities during the hours that commercially sponsored programs are not on the air. The precedent for this type of cooperation between school and television station has already been established and offers no obstacles which cannot be overcome.

School design for television. Although the use of television is not expected to involve any major changes in school architecture, it is natural and obvious that forward-thinking school planners will take into consideration the need for adequate television facilities, and provide for the advent of built-in television screens suitable for the individual classroom.

In New York City, it is required that all school buildings planned or under construction be equipped with television installations. These consist, very simply and inexpensively, of one-inch conduits running ver-

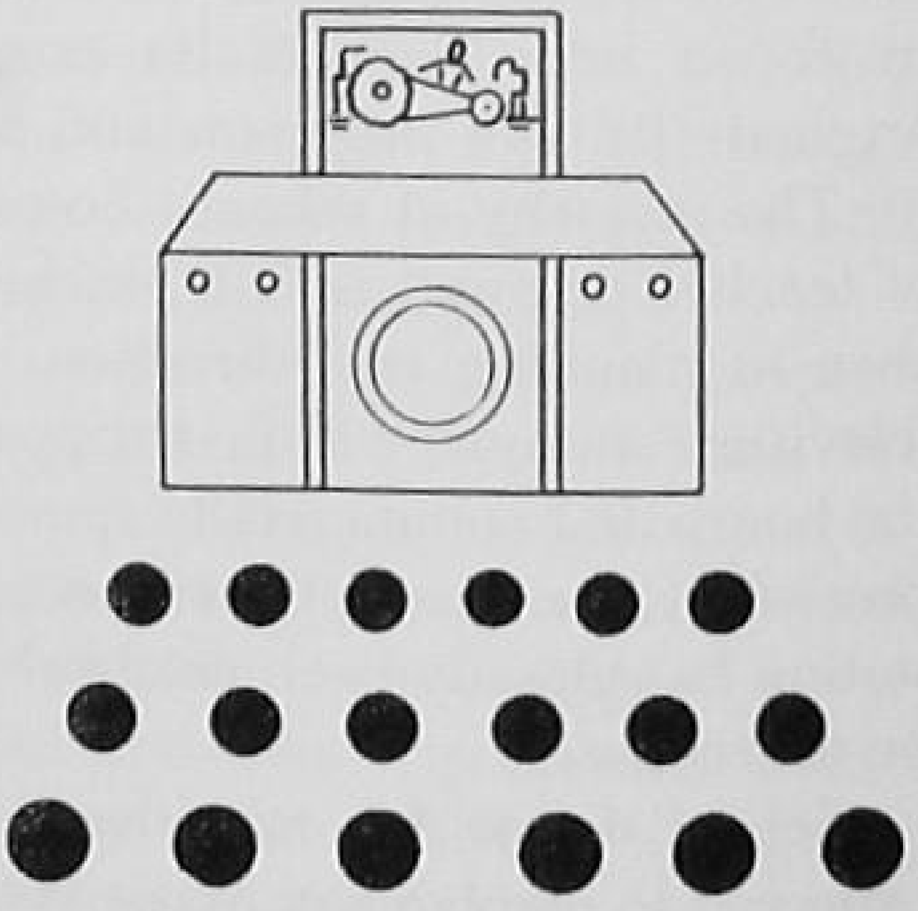
tically from the roof to stations throughout the building, branching off on floors to auditoriums and visual-aid rooms. This means that the addition of a video receiver will consist of little more than plugging in and hooking up; it is in keeping with the American Association of School Administrators' recommendation that all elementary school classrooms be equipped with receivers. A recent development facilitates such multiple-set reception through a master antenna which can furnish television to an entire building or a group of buildings.



Television receivers. Some schools are obtaining receivers through P.T.A. groups or as gifts from organizations. Although these gifts benefit the school concerned, school administrators themselves are well aware of the fact that television cannot adequately fill its role until its financial aspects are frankly faced and solved. As a result of television's growing importance, school boards are recognizing its place in education by including in budgets special funds for television facilities.

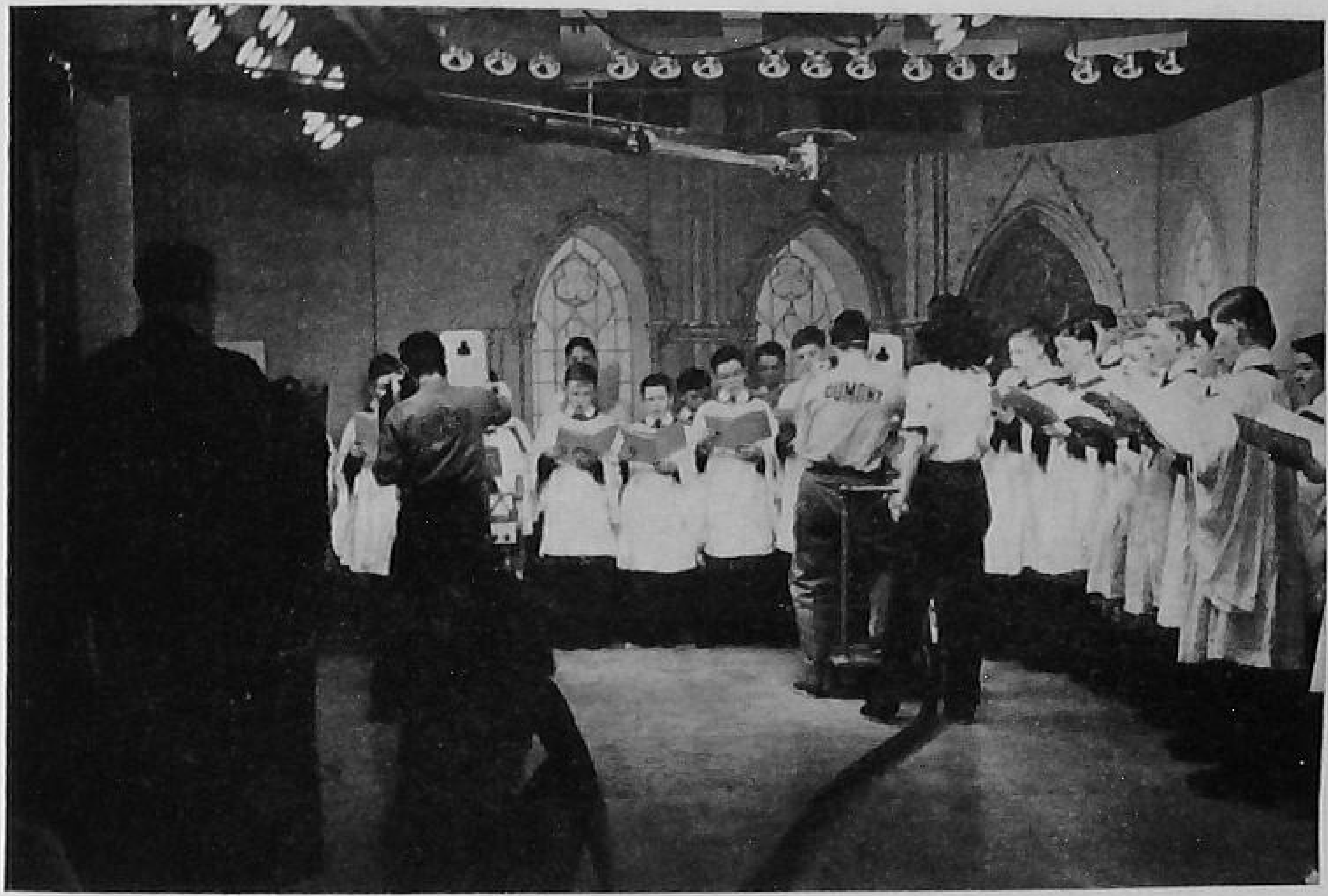
How to Prepare to Use a Television Program

Check all physical factors. The type of teleset, size of screen, and the size and shape of the classroom will determine the number of students that can adequately be handled at one time. Television screens such as the "built-in-the-wall" type have been set up by experienced engineers in the most advantageous spot in the room. However, at the present time, the majority of telesets are of the portable "radio-cabinet" type, and it will depend upon the common sense of the instructor to make sure that the teleset is placed so that the screen is clearly visible to each student. Most satisfactory results can be obtained by confining the program to the smallest possible group of students. Obviously as the size of the television screen is enlarged, a larger number of students will be able to observe the program at one time.



Avoid last-minute fumbling and distractions by checking (1) lighting, (2) ventilation, (3) seating, and (4) the teleset before the group convenes.

Lighting. Total darkness is not necessary because of the screen's construction. However, shading the room will usually incerase the intensity of the image. In most classrooms, it will only be necessary to lower the shade in the front of the room or in the area affecting the screen. Experiment with the lighting until you find the best arrange-



Courtesy of Allen Dumont Labs., Inc.

Television as a medium for religious training.

ment for the specific classroom. A correctly prepared room will shade the screen area and yet provide enough light to permit the student to take brief notes on the broadcast program. By all means prevent the outside rays of light from falling on the screen or shining in the face of the students.

Check the room light switch to make certain the power for the teleset is not controlled by the same switch.

Ventilation. The importance of proper ventilation cannot be overemphasized. Regardless of how interesting a program may be, a hot, stuffy room induces drowsiness and causes the student to lose interest.

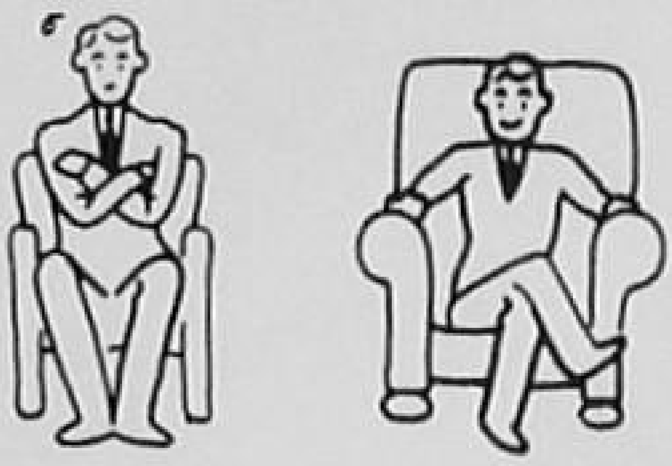
Occasionally, cross ventilation between the window and a door at the rear of the room will help alleviate this condition. Of course, best results are obtained if the classroom is air-conditioned. However, until this is possible, an ordinary electric fan or a portable air-conditioning unit will help solve the ventilation problem whenever it arises.

Remember, when the temperature rises above 72 degrees and the

humidity above 50 per cent, teaching becomes a difficult process for both the instructor and student.

Seating. The exact seating arrangement will depend upon the size and shape of the room. Generally, the following rule should be observed. For better vision, confine seating arrangement to a space formed by a 45-degree angle. Leave approximately six feet between the screen and the first row of students. In most cases the image on a screen will became distorted when viewed from outside this space.

Do not overlook the effect of a comfortable chair. It can change a disagreeable meeting place into a haven of delight for the student.



The teleset. Select the proper station and make all necessary adjustments before the group meets. Switch off the teleset after the station is properly "tuned-in." When the program begins, it should only be necessary to switch on the teleset. Allow approximately thirty seconds for the tubes to warm up. Accurate timing is essential: this is good showmanship and tends to give the program a more professional air.

Television in the Classroom

At present, many schools are not in television areas. But, it will not be long before a large number of schools will have this advantage. Therefore, consideration should be given to installing this vital teaching aid as soon as it is available in your community.

Selection of a receiving set. The television set you purchase depends on the size and specific needs of the school. There are two types, namely, the direct-view type and the projection model. In the direct-view model, the screen (actually the face of a kinescope or a picture tube) is built into the receiving set. In the projection model, the image is projected on a screen in a manner similar to the motion picture projector.

Direct-view models. Direct-view models have kinescope tubes ranging in diameter from 7 to 20 inches. The price of the unit increases as the size of the viewing area increases. But if the receiving set is suitably placed, 15 to 20 students may observe the viewing screen of the smaller tube. Approximately 100 students may satisfactorily view a picture produced by a 21-inch tube.

Master television sets having viewing screens in several rooms to operate very much like a central sound system may be obtained. The master receiving set would be located in a central area and television programs would be "piped" into the individual classrooms. A central television system would greatly reduce the expense of providing tele-

vision programs for the classrooms, and of course would be very acceptable to school administrators for this reason.

Projection television sets. The projection models are more expensive than the direct-view sets, but they do provide a much larger image on a screen. Some projection sets now provide pictures that would fill a regular theater screen. Such models would be extremely valuable for large classrooms and auditoriums.

Portable television projectors. Life-size television pictures are now available through a mobile large-screen television projector, such as the model developed by RCA. This portable unit will project a clear 63 square foot picture at a distance of 17 feet from the viewing screen, and a correspondingly smaller picture at a shorter distance. Accompanying sound is supplied by a speaker near the screen. Rear projection on a translucent screen is also possible with this unit.

The portable projector is simple to operate. The controls, operated like those of a home television set, permit adjustment without blocking the path of the projected picture.

How to Use Television in Teaching

In order to utilize a television program effectively, the instructor should (1) obtain a copy of the script or discuss the program with its sponsor before the broadcast and (2) secure all related printed materials, such as manuals and leaflets, pertaining to the topic of the broadcast.

In some cases, program sponsors might be reluctant to distribute scripts of their programs prior to their broadcast. However, a discussion with the sponsor, either personal or by mail, would reveal the nature of the contents and provide the instructor with a working outline. This advance knowledge is of the utmost importance.

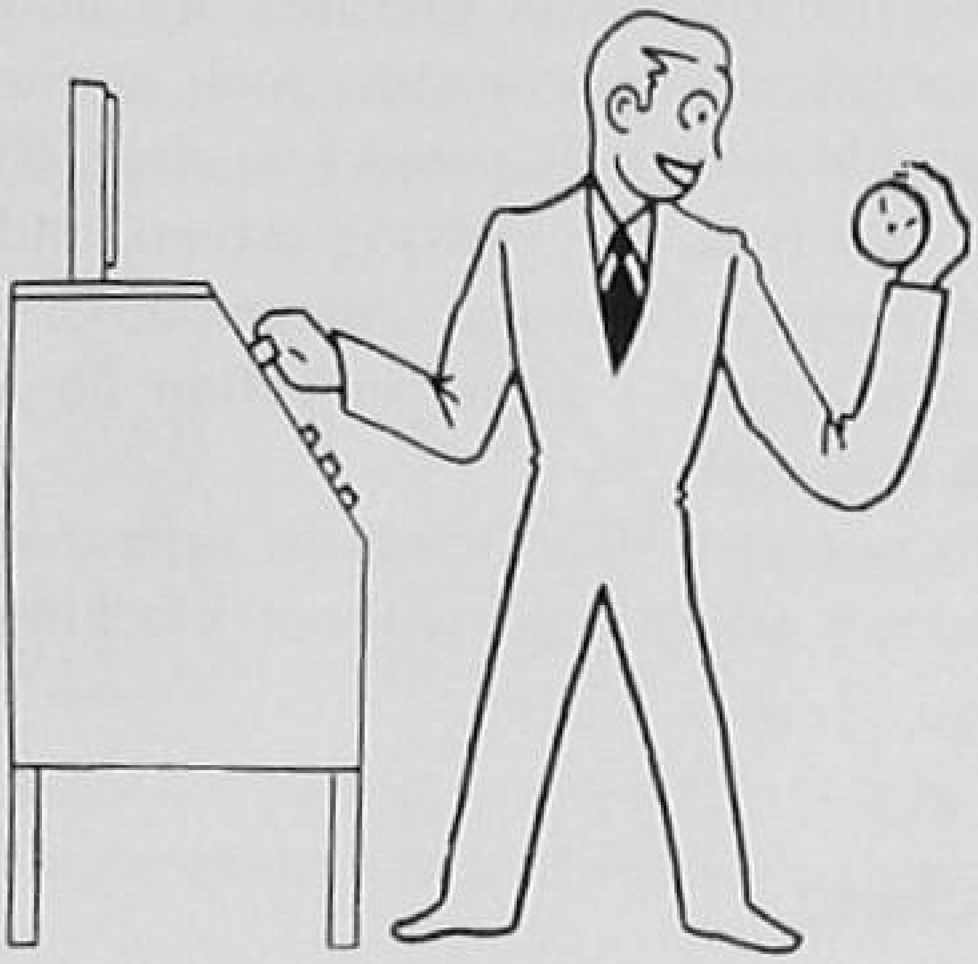
Eventually more related printed material will be made available as more sponsors tie up their advertising campaigns with their television broadcasts. This material will not only guide the instructor in the preparation and presentation of his instruction, but will also be of help to the student in the follow-up activities after the broadcast.

Variations in the different types of broadcasts will not alter the fact that the most satisfactory results may be obtained by observing the following steps:

1. *Prepare the student.* Proper student preparation becomes even more important when it is to be followed by a television program. The enthusiasm and interest of the student should be so thoroughly aroused

that the student will get as much as possible out of the broadcast. One of the most effective ways of doing this is simply to point out to the student how he can personally benefit by a complete understanding of the subject. Second, the instructor should guide the student's thinking by telling him exactly what important points to observe and remember.

2. *Present the television program.* Proper timing is essential in the use of this most modern teaching aid. If notes or sketches are to be made during the broadcast, the instructor should make certain that each student is supplied with pencil and paper before the program starts, and as the broadcast develops the student should note the important points or steps that were discussed by the instructor during the preparation. The student should confine his note-taking to brief outlines to avoid missing other important parts of the broadcast. At the end of the program, the instructor should allow the student time to complete his notes or sketches. This should be done immediately after the broadcast while the material is still fresh in the mind of the student.



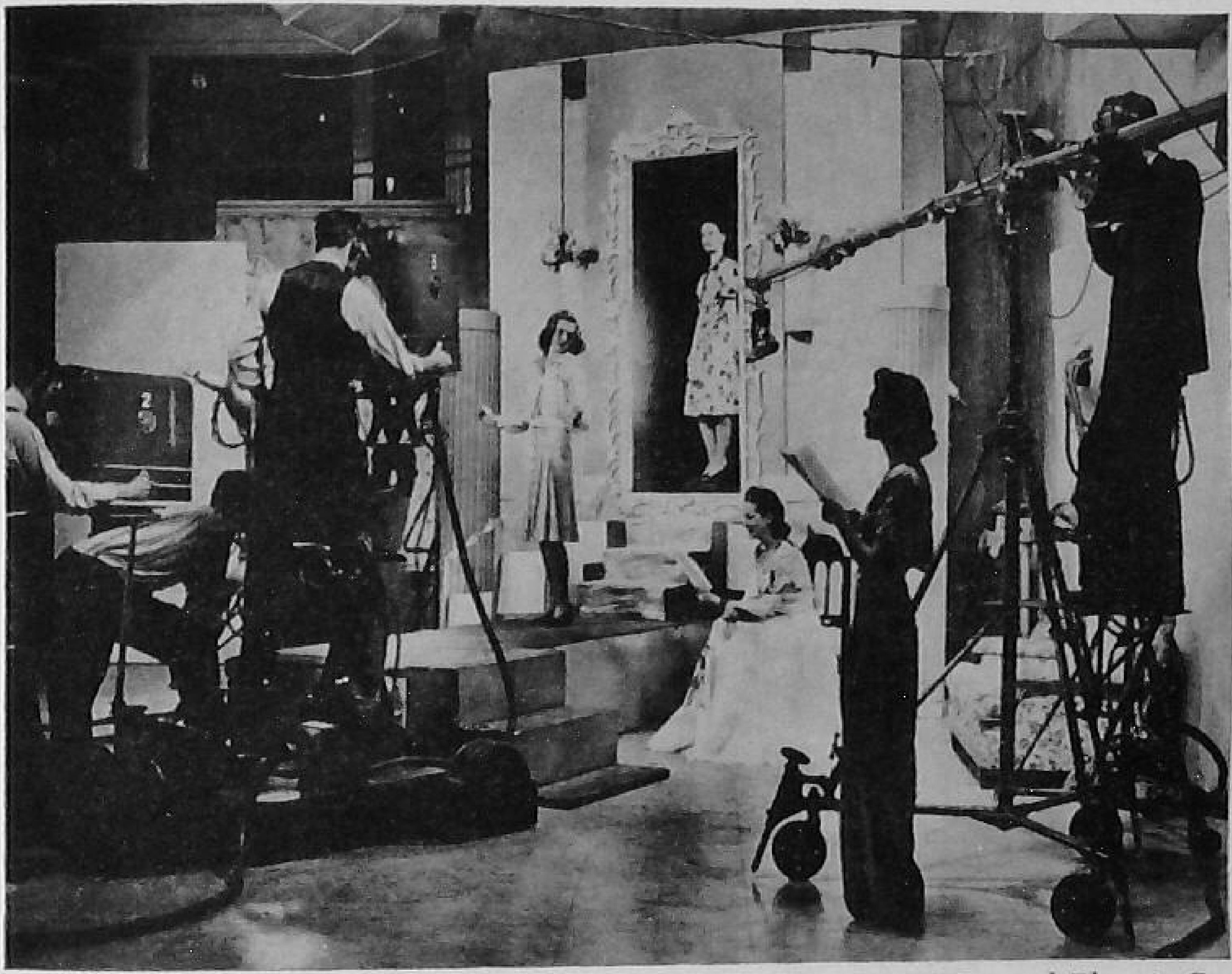
3. *Discuss or apply the subject.* After the student's notes or sketches have been prepared, the subject should be discussed or applied as soon as possible.

Factual information, attitudes, and morale topics may usually be best handled by informal conference discussion. Each student should be given an opportunity to clear up any misunderstanding which he might have at that time. The instructor, who will act as the discussion leader, should guide the discussion and summarize each point as it is clarified by the class. A check list of the important points or steps will also be very helpful in guiding the instructor. The skilled conference leader should observe all the good practices of conference-leading to make this discussion a vital feature of the educational process.

Problems which deal with manipulative skills may be most effectively handled by permitting the student to perform and demonstrate the operation. Each student should be given an opportunity to perform the job until he obtains a complete knowledge of it. Asking the student to perform the job and explain each step to the class will enable the instructor to check on his manipulative speed and the use of proper technical terms.

Manuals, booklets, leaflets, and other program sponsor's literature that satisfactorily cover the important points of the broadcast will make it un-

necessary to take notes, and will permit the student to devote his complete attention to the program. However, if the available sponsor material is incomplete or impractical, it will be necessary for the student to use his own notes or sketches as a guide in the discussion or application.



Courtesy of General Electric Co.

Television as a medium for product exhibition and sales promotion.

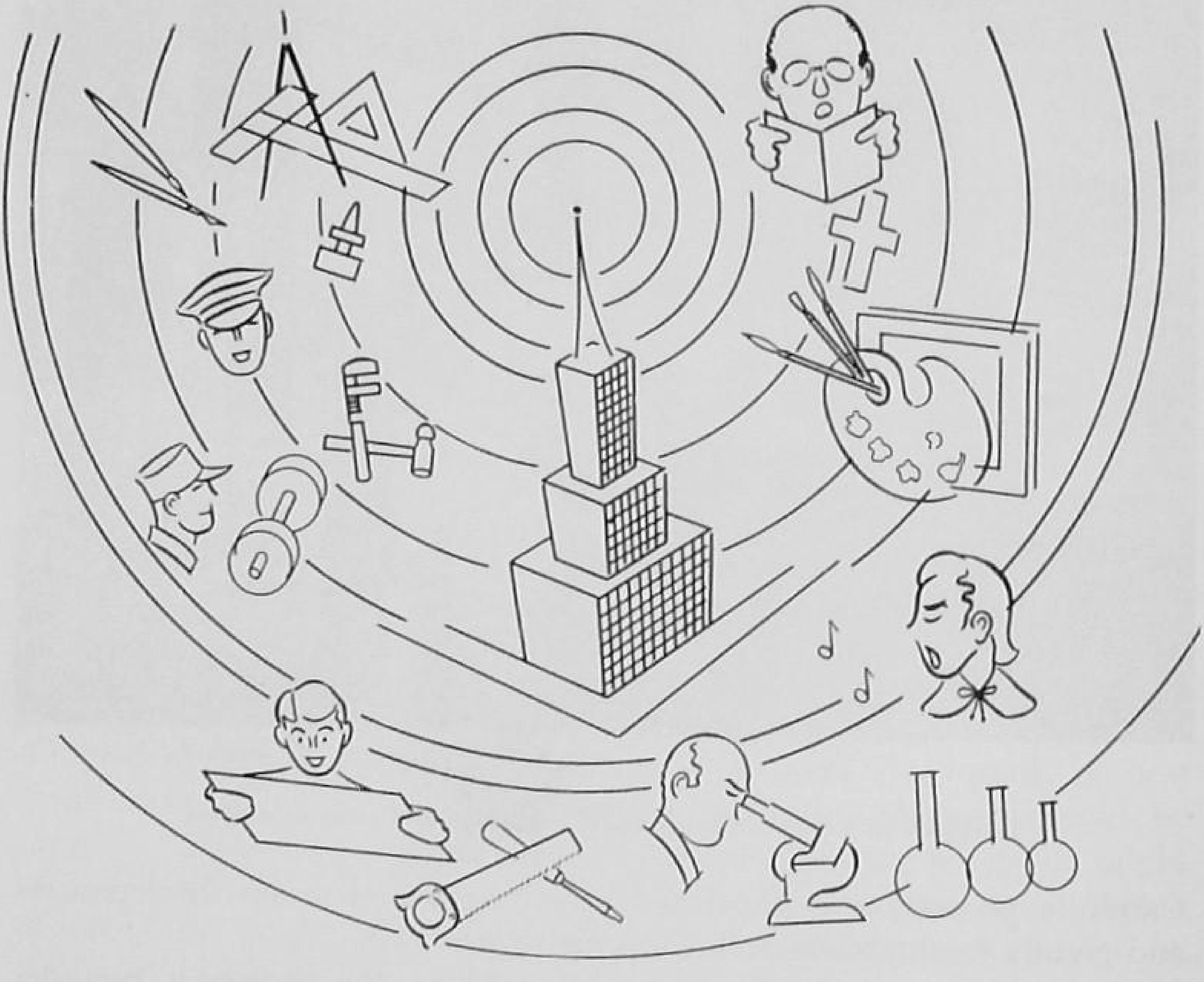
Carefully planned and illustrated literature can clear up discrepancies and greatly facilitate the follow-up activities.

The outline and the literature prepared by the broadcast sponsors will serve as excellent sources of reference, and should be filed for future use.

4. *Test the student.* The student understanding of the televised subject should be checked—not chiefly to determine a grade or mark, but to discover student weaknesses and errors. The test may be oral or written. However, lengthy subjective examinations should be avoided. The most effective results can be obtained with a brief objective test or check list. Pertinent "true-false," multiple choice, completion, and match-type questions are most satisfactory. Check lists or tests, such as the response cards used in the United States Navy training program, which have been constructed so that it is only necessary for the student

to punch a hole or place a check mark, have been very successful. The most important factor is that the test be constructed so that it will indicate what the student knows or does not know about the specific topic in a simple and brief fashion.

5. *Review the topic.* All student weaknesses or errors which have been disclosed by the test should be corrected immediately. If necessary, each student should receive individual instruction. The student must have the proper knowledge or be able to perform the skill correctly.



An ideal review of the topic would be to reshow the television program. However, until this becomes possible, the instructor may use the student outlines, sponsor's literature, flash cards, posters, charts, graphs, diagrams, pictures, models, specimens, objects, motion pictures, slidefilm, slides, or any other pertinent teaching aids related to the specific lesson. The exact types of teaching aid or combination of teaching aids to use will be determined by the particular problem. The aim of the instructor is not to expose the student to a multitude of sensations, but to use every possible aid at his command to make certain that the student understands and can perform the job. Remember, if the student cannot perform, the instructor has not taught.

The Future of Television

As the number of teleset users increase, and the costs per unit continually decrease, new ideas and improvements in broadcasting technique will raise television to its pinnacle of importance in the field of instruction.

Television can be one of the truly significant aids to good instruction. It can be to the classroom teacher what the pigments, canvas, and brushes are to the artist . . . a combination of elements that can be used to create daubs or masterpieces. Television is here. It is now up to the educator to provide the guidance and assistance necessary to bring its vast educational potentialities to fruition. The dangers of misuse, as well as the values of potential good, are the responsibility and concern of the teaching profession. Much talent and money will be devoted to developing television as a sheer entertainment medium. Whether or not its educational potentialities fall by the wayside will be determined largely by the energy and imagination with which educators test and use television while it is till in its formative stages. Education can utilize television to open wider horizons and bring knowledge to our future citizens as well as it now offers mass selling to the general public.

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Eddy, William C., *Television: The Eyes of Tomorrow.* New York: Prentice-Hall, Inc., 1945.

Hutchinson, T. H., *Here is Television: Your Window to the World.* New York: Hastings House, 1950.

Sposa, Louis A., *Television Primer of Production and Direction.* New York: McGraw-Hill Book Co., 1947.

Special problems

Write to Educational Division, Public Relations Department, R.C.A. Victor Division, Camden, N. J.

For initiating a program

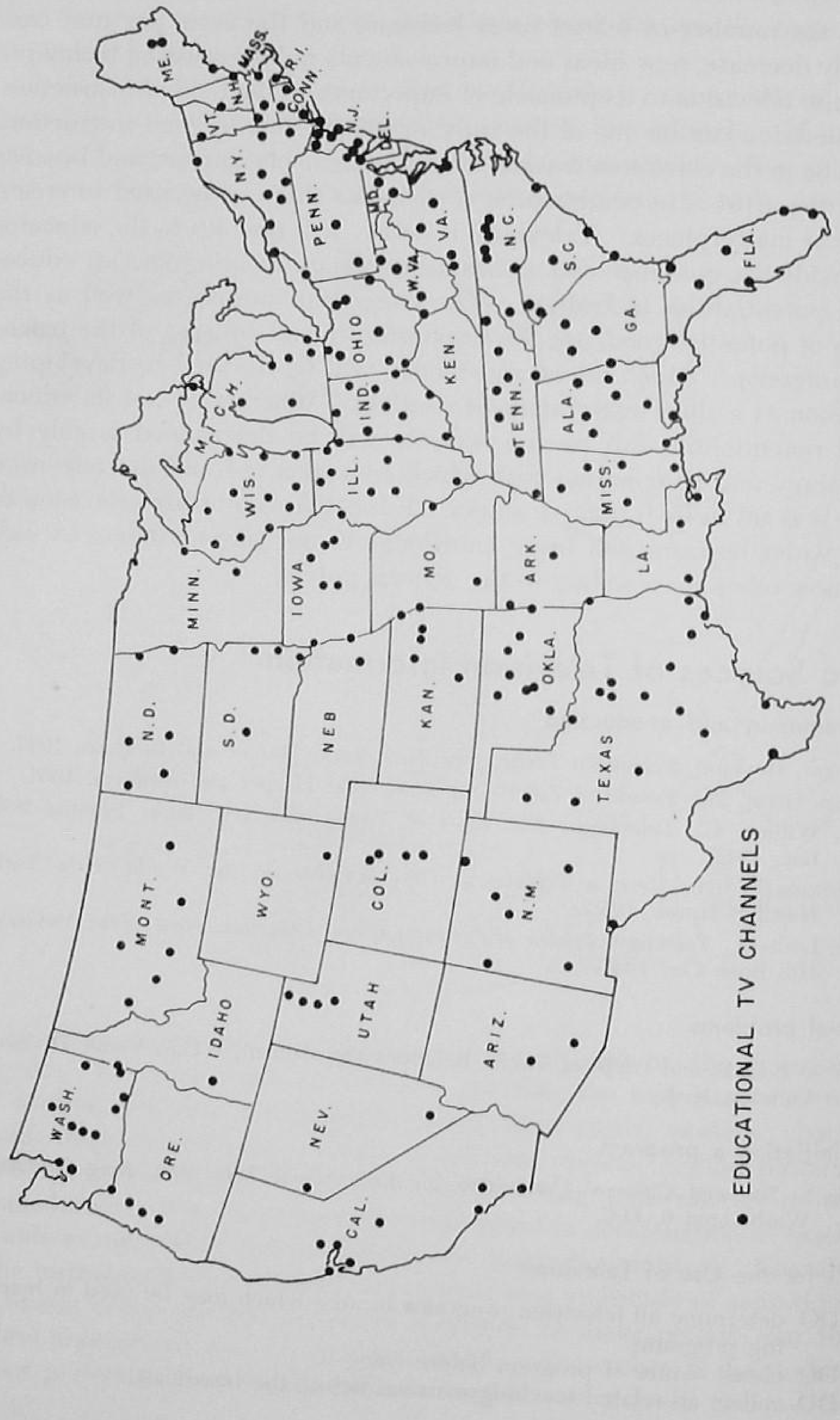
Write to National Citizens' Committee for Educational Television, Ring Building, Washington 6, D.C.

DO's for the Use of Television

DO determine all television programs in area which may be used in teaching programs.

DO check nature of program before using it.

DO collect all related teaching material before the broadcast.



● EDUCATIONAL TV CHANNELS

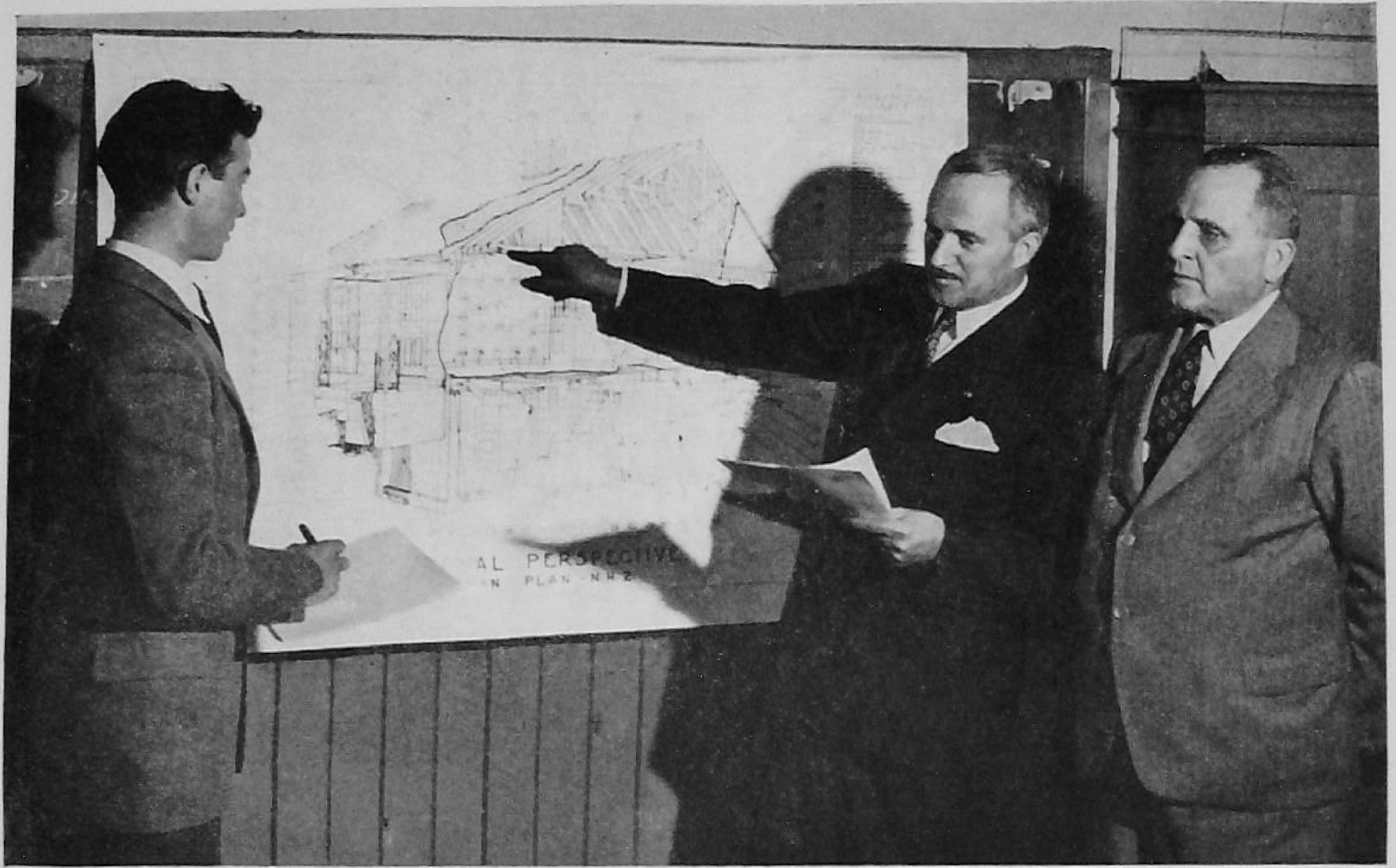
DO select the best lighting arrangement for specific classroom.
DO provide proper ventilation.
DO check seating arrangement before class meets.
DO tune in the proper station on the teleset before the class meets.
DO check watch for perfect timing.
DO prepare the student for the telecast.
DO make sure each student can see the screen.
DO discuss or apply the problem as soon as possible after the broadcast.
DO use student outlines or program sponsor's literature in the follow-up activities.
DO test the student's knowledge of the problem.
DO use brief, pertinent objective tests.
DO review the problem.
DO utilize all other related teaching aids.
DO file all sponsor's material relating to the broadcast for future reference.
DO remember if the student cannot perform, the instructor has not taught.

QUESTIONS

1. Why is television said to be the most versatile audio-visual aid?
2. What are the advantages of television for educational purposes compared with those of radio?
3. What kind of television broadcasts may be most effectively used for educational purposes?
4. What are the advantages and disadvantages of commercial TV?
5. What are the advantages and disadvantages of educational TV?
6. What is "closed circuit transmission"? How would you use it?
7. How has TV influenced school design?
8. What physical factors should be checked before a televised program is viewed?
9. What preparations should be made by the instructor before viewing a televised program?
10. What steps should be followed in using televised programs for education? How should each of these steps be handled?
11. What are the advantages of a National Program Center?
12. What do you believe is the future of television?

PROBLEMS AND PROJECTS

1. Make a plan for using television broadcasts for instructional purposes. The plan should check on all physical factors, your preparation to instruct, and the steps involved for good instruction.
2. List the "Do's for the use of television."
3. Prepare a plan for school use of television. Indicate how you would determine educational objectives; how you would organize your subject matter; how you would "sell" your administration on your idea.
4. What is a basic pattern for starting an educational TV station?
5. What is the procedure for starting an educational TV station?



Courtesy of City College of New York.

Before criteria can be established, the objectives of the instruction must be stated.

Evaluation of Audio-Visual Aids[1]

There has seldom been so much misconception and erroneous thinking on any educational subject as there has about audio-visual aids, their preparation and use. Audio-visual aids *may* be as potent as the crystal ball educators claim they are, but like Indian Snake Oil, that potency needs proof.

Do you believe in instructional aids? Do you find it hard to convince your administrator? Does he want objective evidence? Can you furnish that evidence? If not, this chapter should be of great assistance.

Nature of instructional aids. In the introduction, four specific terms are defined. These are:

(1) Instructional aids
(2) Visual aids
(3) Audio-visual aids
(4) Audio aids

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[1] Details regarding measurement of specific subjects and areas of education may be found in *Film And Education*, Godfrey M. Elliott, Editor, Philosophical Library, 15 E. 40th St., New York, N. Y., 1948. Another excellent treatise on the evaluation of sales training, with implications for the measurement of instructional aids, may be found in the *Handbook for Sales Trainers*, Kenneth B. Haas, Editor, Prentice-Hall, Inc., New York, N. Y., 1949.

Two further terms are now introduced and defined:

Criteria are rules or tests by which anything is tried in forming a correct judgment respecting it.

Evaluate means to place a value on the results attained.

Determining instructional objectives. Obviously, before criteria can be established, the objectives of the instruction must be known.

Possibly the most important element in building an instructional program is the determination of objectives or goals. In other words, what is the instruction to accomplish? The answers to this question are important, for most other factors in an educational program depend upon what objectives are established. Any instructor or educational organization can create specific and related objectives for its courses. When the objectives have been established, criteria of instruction can be prepared and used for the measurement of results.

Curbstone Evaluations

Subjective evaluations. Thousands of evaluations of instructional aids have been made. All but a few of them have been subjective and therefore are invalid and unreliable.

Instructional aids are widely used because the following claims have been made for them. Through the use of instructional aids students are said to:

Learn more	Learn uniformly
Remember longer	Give better attention
Learn faster	Have better morale.

These claims are largely unsupported by facts. They are surmised, however, to have the qualitative and quantitative values mentioned, but little has been done to validate the claims. Research is badly needed in this area.

It is generally believed that *each* of the instructional aids discussed in this text has its own definite and specific advantages for instructional success. All of them, moreover, are said to have certain general advantages in aiding the student to learn swiftly and effectively. It is claimed that instructional aids render service in many general ways. For example:

By creating more vivid impressions. Try to remember what dress one of your students had on yesterday and you cannot recall. But just suppose she appeared tomorrow in "gay-nineties" apparel. *There* would be a vivid and lasting impression. Aids, properly used, can "dress up" your instruction just as dramatically and drive home the important points with equally vivid, though perhaps less startling, impressions.

By using additional organs of sense. They assist the student in the assimilation of knowledge. Without *any* aids the instructor could only tell his story—depending entirely on the student's hearing to carry the message to the brain. When instructional aids are added the student will benefit by what he sees, feels, and in some cases, even by what he smells and tastes.

By getting and holding the student's attention through "change of pace." Only the most gifted of instructors can hold the full attention of students for one hour of straight lecturing. Fatigue and monotony rapidly reduce the amount of learning unless relieved by "change of pace." Thus we use instructional aids, like recess periods, to keep the student alert and interested in what's coming next.

By simplifying the knowledge to be learned. All instruction should be preceded by careful analyses and setting of objectives. Selection of instructional aids stimulates such analysis, to eliminate nonessentials, and to spotlight matters of real importance.

By improving the quality of the instruction given. Did you ever participate in a parlor stunt in which a dozen people standing in a circle repeat a sentence from ear to ear around the ring to see how distorted it is when the circuit is completed? The same distortion can happen to the best teaching plan ever developed unless the story is firmly nailed down with instructional aids. A sound slidefilm or a motion picture, for example, sounds the same in Pascagoula as in Presque Isle. And partially, at least, they tell the same story and eliminate the hazard of "hearing" and "seeing" different things.

Subjective disadvantages. While the advantages of instructional aids are believed to outweigh the disadvantages by far, there are undoubtedly certain limitations to the use of such devices. The following statements are typical of commonly expressed disadvantages.

First, if an error of omission, distortion, misapplication, or overemphasis is made, that blunder will be carried "as is" down the communication line to the learner. There is no stopping this defective transmission of undesirable instruction unless it is known before it reaches the learner. This is a disadvantage, for corrections are costly, and when errors are undetected they may be calamitous.

Second, some instructors have acquired the idea that they have little or nothing to do when audio-visuals are employed. This mistaken idea often leads to ineffectual teaching, for there is no substitute for the part played by a good instructor. There is no *magic* in audio-visual aids. Some instructors have a quaint notion that all they need to do is turn a switch, and, presto, the job is done. Results from the use of audio-visual aids are profitable only when a carefully devised lesson plan is used by a thoroughly trained instructor.

Although the proponents of instructional aids appear to have more

substantial facts than the opponents, it is important once more to state that there remains a tremendously large grey area about which we can make no valid or reliable statements. What can we do about this situation? The answer is not simple, but it is possible to suggest criteria and methods of evaluation that can be applied to any instructional aid.

Criteria for Evaluating Instructional Aids

Criteria for selection. It is difficult to discuss *all* instructional aids in considering specific effectiveness and criteria. The reader can choose any *one* specific kind of aid, however, and apply to that aid the following criteria:

1. *What are the objectives, goals, or aims* that he wants to accomplish?

2. *Who will be taught?* What are their age, apperceptive base, native intelligence, social intelligence, and other factors? Get a composite picture of the group, based on these factors, before attempting to select an aid.

3. *Budget allotment.* In practically all cases, budget limitations will determine the aids that may be purchased or rented.

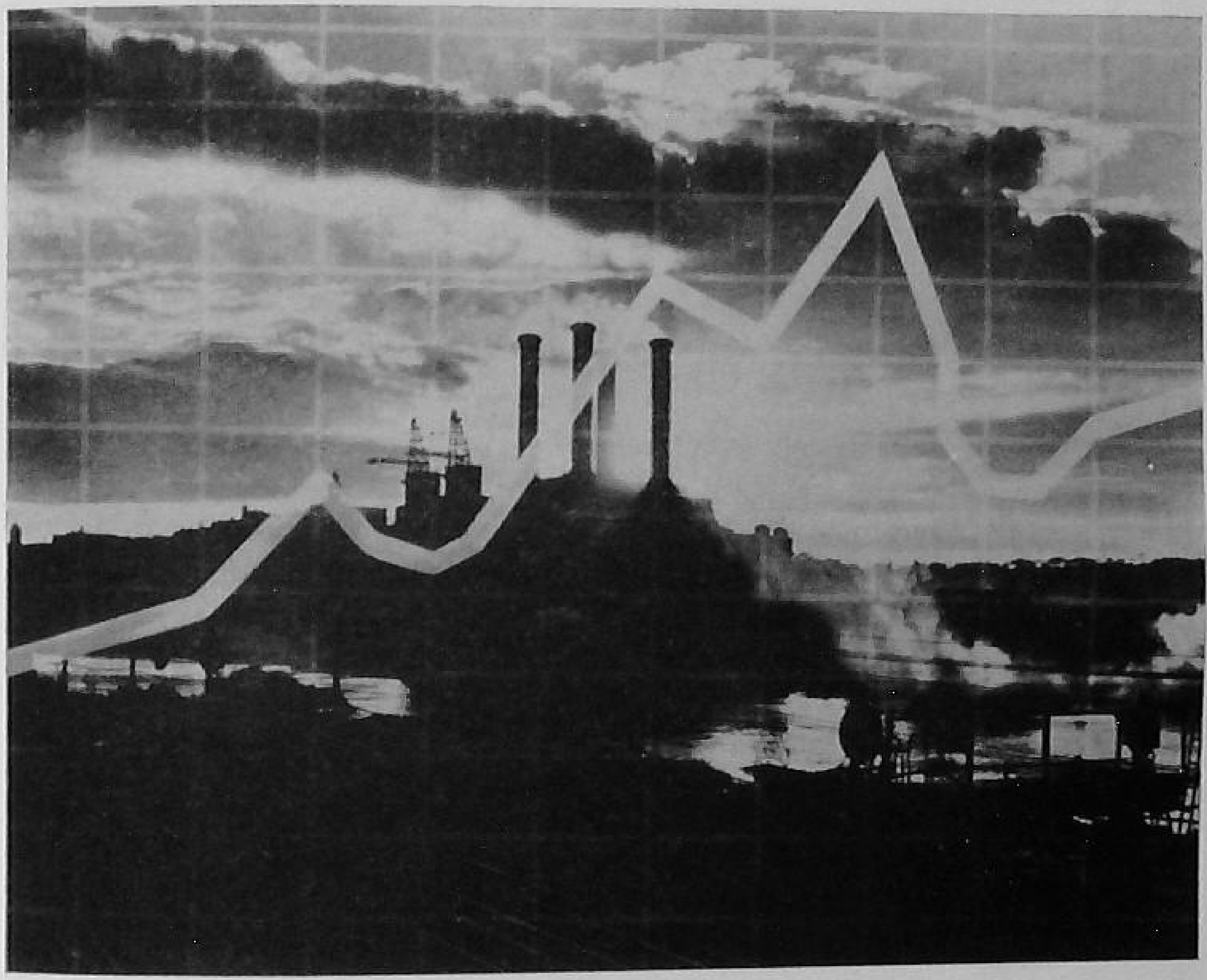
4. *Size of group.* The number of people in the group or class will determine the kind of aid that may be used. For example, blackboards or flash cards could not be used effectively in an auditorium seating 1,000 people. The use of a projected aid would be essential in that situation.

5. *Ability of instructor.* It would be senseless to select and later attempt to evaluate an instructional aid that an instructor cannot use effectively. The evaluation of an aid cannot be measured apart from the instructor.

6. *Time allotment.* The effective use of many aids requires a definite amount of time. Motion pictures consume a specific amount of projection time. Sound slidefilms come in a sequence that requires continuous showing. Many blackboard problems cannot be presented in a limited time. And field trips nearly always require several hours. Obviously if instructional time (class periods) interferes with the use of certain instructional aids, they should not be chosen. Briefly, the aid must be tailored to fit the time allotment.

7. *How many will be instructed?* Obviously the number of students dictates the kind of instructional aid to be used. Very large groups, for example, require motion pictures, or other projected devices such as a slidefilm strip and sound slidefilm, that are clearly visible to all. On the other hand, the large group might subsequently be divided into many small groups—then a blackboard, chart, flash card, specimen, object, model, or some other nonprojected aid would be most productive.

8. *Nature of desired results.* Does the instructor want to increase morale, create certain attitudes, implant knowledge, teach specific skills? There are instructional aids designed to accomplish each of these aims. There are other aids that would be worthless to attain certain goals.



Objective evidence is necessary to prove the values of audio-visual aids.

Careful consideration of these criteria before attempting to evaluate *any one* instructional aid is a must, in an attempt to measure end results.

Criteria for measurement of effectiveness. Criteria for the measurement of the effectiveness of a specific instructional aid would also include a consideration of certain other factors. How can an instructor *know* and prove that his instructional aid is effective in assisting him to attain his objectives? The criteria that help answer this question are:

1. Student reactions and increased learning efficiency.
2. Participation and interest evidenced by all other instructional personnel concerned.
3. Identified deficiencies that have been overcome.
4. Composite rating obtained from tests—objective or performance.
5. Cooperation of parental and all other outside personnel concerned.
6. Total cost.

Evaluation Technique

Research technique. A practical way to evaluate instructional aids is to consider each one separately, not as a group nor in conjunction with recognized instructional methods. Each instructional aid must be segregated, used under controlled conditions, and then evaluated in terms of the objectives that have been created. These objectives then become a *standard of performance* against which achievement may be checked.

The research technique to employ in this instance is the experimental type. Experimental research involves the use of an experimental group and a control group. The experimental group would receive specific predetermined instruction with the aid of a specific instructional aid. There would be no other variation—all else would remain the same.

The control group would be instructed in the usual lecture without the instructional aid used with the experimental group. The same subject matter would be taught to both groups by the same instructor, on the same days, in a similar room under the same conditions in all respects, except for the use of the specific aid with the experimental group.

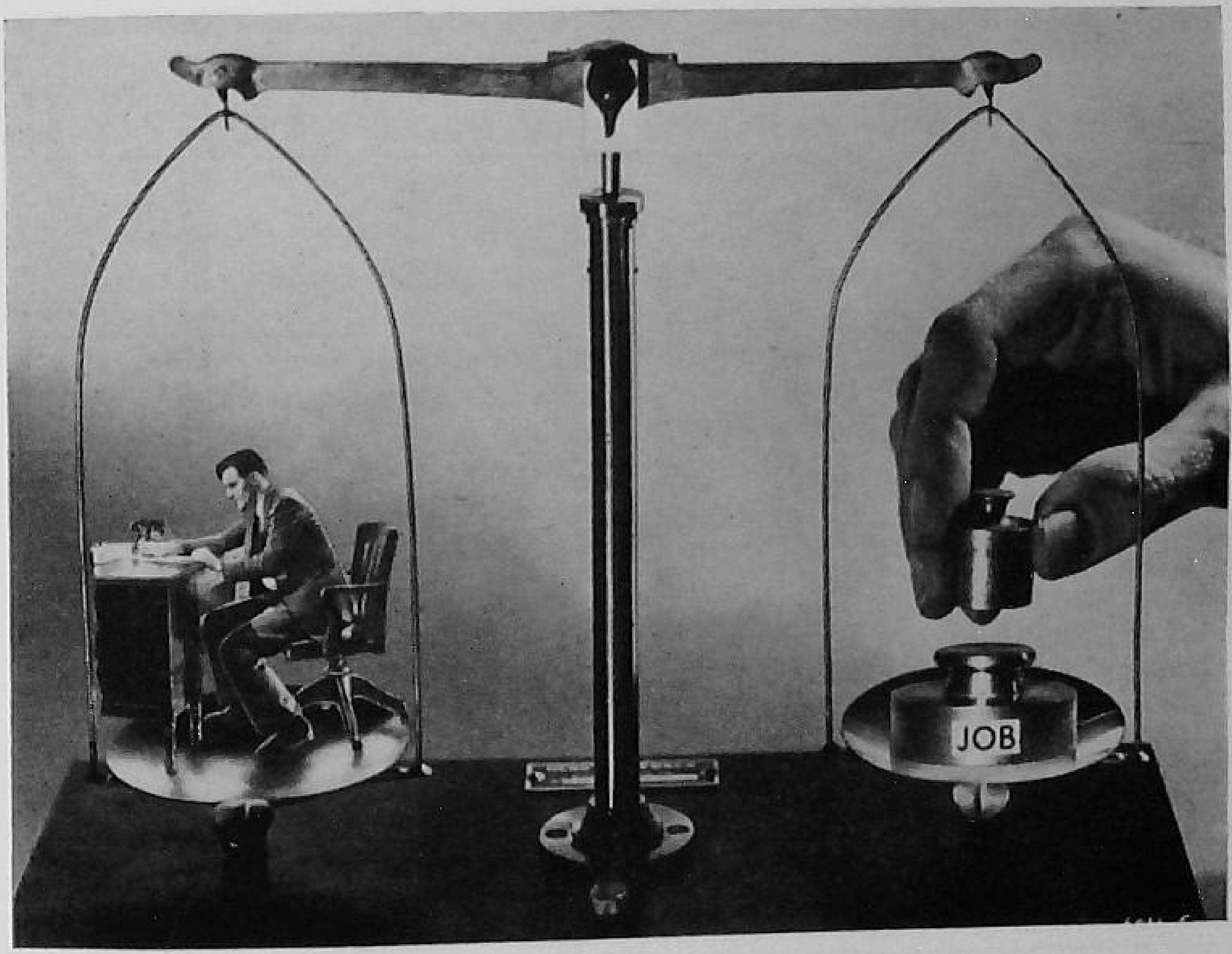
At the end of the allotted time, the two groups would be tested orally or in writing. The results could then be compared and correlated with the objectives, or standard of performance, that had been set up.

Standards of performance. To be recognized by administrators and supervisors, the values resulting from the use of instructional aids must be measurable. They must be weighed in relation to expenditures of money and effort. It is necessary to have standards against which to measure. In measuring the results obtained through the use of instructional aids, two standards may be used: first, a recorded past performance *from* which progress can be shown; and second, an established goal or objective *toward* which progress can be shown.

To use the first of these standards, it is necessary to have factual records and recorded impressions before the instructional aids are used. Very few schools have records complete enough to serve as a standard of progress. Opinions and impressions held by instructors, supervisors, and administrators are general in nature, and are usually tied to intangibles that are very difficult or impossible to measure.

For an educational situation, probably the most realistic standard of measurement is to base all judgment of results upon established objectives. Progress toward the objectives should be judged as objectively as possible. A caution to observe is that some results will be obtained immediately and others will develop more slowly. Also, some may be detected by tangible changes and others, such as improvement in morale, may reveal themselves primarily as a change in the "school, or learning, climate."

Measuring against a standard. After the controlled experiment has been completed, the person who conducted it will want to measure the results against a standard of performance. This is based upon the objectives for the training. In other words, two questions are employed: What were the objectives of the instruction? How did each group measure up to the objectives when the teaching period terminated? Standards of performance may be formulated by recasting and rephrasing the terminology employed in stating the objectives.



Results must be measured against a standard of performance.

The form on page 284, for example, indicates how objectives may be rephrased, how the results of the experimental research technique may be recorded, and how the comparative results may be reported. The reported results can then be compared with the standards of performance and the final evidence presented.

Although the example applies to instructional aids used in the sales field, the principles apply in any area of education. Even in the sales field the same form would need adaptation from company to company. The same is true with school subjects and between classes and schools.

Presenting the evidence. Through the use of the criteria and processes of measurement that have been suggested, an instructor can determine

the benefits received from the use of instructional aids. Through the use of tabulated comparative facts, much convincing evidence about teaching aids can be presented, which will probably prove to the administrator, school board, or to management that the purchase of instructional aids is

ANALYSIS OF SALES EFFECTIVENESS

TERRITORY ______________________ TO DATE ______________________

SALESMAN ______________________

(Two columns to be used at a time for comparative figures for any period of time desired.)

	Experimental	Control	Experimental	Control
Total Gross Billings Total Field Expense Total Cost to Sell % Cost to Sell				
No. of Working Days No. of Days on Road Total No. of Calls No. of Detail Calls No. of Phone Calls Avg. Calls Daily Total No. of Orders No. of Mail Orders No. of Detail Orders % Mail Orders % Calls Sold				
Avg. Daily Billings Value Avg. Order Average Daily Expense Cost Per Call Cost Per Order				
Avg. No. Customers Avg. Billings per Customer Cost per Customer				

a profitable *investment*. Furthermore, the evidence will be objective, logical, and easy to comprehend.

The objective evidence presented will be particularly striking if a control group is used as a basis for comparison. Even the most stubborn exponents of the claim that "instructional aids are not what they are cracked up to be" can never successfully refuse to believe the results of a comparison obtained by matching the production of an experimental group against the production of a group of students who have not received the benefits of instructional aids.

WHAT IS YOUR SCHOOL'S I.M. QUOTIENT?[2]

Does Your School Have Adequate Instructional Materials?

by

WILLIAM H. DURR

SUPERVISOR OF BUREAU OF TEACHING MATERIALS, STATE BOARD OF EDUCATION, RICHMOND, VIRGINIA

UPTODATE school programs require a wide variety of instructional materials geared to the interests and abilities of children. These materials include motion pictures, slides, filmstrips, recordings, radio, and television—in addition to books, maps, and charts.

The following list of questions has been prepared so that you can determine the adequacy of your school's instructional materials. A study of the questions you checked as "no" will point up areas which may need improvement.

Administration	YES	NO
1. Does your school system have a director of audio-visual education or instructional materials?	____	____
2. Does this person perform the following services?		
[a] Supervise selection of materials for purchase and addition to your audio-visual department.	____	____
[b] Inform teachers about available materials.	____	____
[c] Assist in providing audio-visual facilities.	____	____
[d] Provide for the distribution of materials to teachers when needed.	____	____
[e] Help teachers to make good use of materials.	____	____
3. Is there a person in your building who serves as co-ordinator of audio-visual instruction?	____	____
4. Does he have released time from teaching to carry thru these responsibilities?	____	____
5. Are any of the teachers active members of		
[a] NEA Department of Audio-visual Instruction?	____	____
[b] State or local audio-visual organizations?	____	____
6. Is there an advisory committee on audio-visual instruction in your school system, with members of the teaching staff on the committee?	____	____
7. Does this committee assist in formulating plans and policy for the development and operation of the audio-visual program in your schools?	____	____
8. Do teachers assist in the selection of instructional materials for purchase for your school?	____	____
Materials		
9. Do teachers in your school have readily available the following types of materials?	____	____
Motion pictures	____	____
Filmstrips	____	____

[2] Reprinted from the *NEA Journal*, October 1953, by permission of the *Journal* and Mr. Durr.

	YES	NO
Slides	____	____
Recordings	____	____
Flat pictures	____	____
Maps and charts	____	____
Models and exhibit materials	____	____
10. Does the budget permit teachers to rent and pay postage on materials such as films which they need to use in their instruction and which are not available locally?	____	____
11. Does your school provide equipment and materials that teachers and pupils may use in producing their own audio-visual materials, such as cameras, film, slide-making materials, recorders, mounting board?	____	____

Information on Materials

12. Is there information on local resources which may be used on field trips or at school?	____	____
13. Do teachers have ready access to catalogs and listings of available materials?	____	____
14. Are materials frequently displayed so that teachers become aware of them and are encouraged to use them?	____	____
15. Are teachers invited to frequent the audio-visual center to browse and find out what materials are available?	____	____

Distribution of Materials

16. Is it easy for teachers to request the use of audio-visual materials?	____	____
17. Are teachers informed in advance whether requested materials will be delivered to them when needed?	____	____
18. Are such materials provided to teachers for sufficient periods of time to permit preview, proper showing, and re-showing?	____	____
19. Does the center provide for keeping materials and equipment in good condition?	____	____

Facilities for Using Materials

20. Can the amount of light in the classrooms be controlled so that films can be projected clearly?	____	____
21. Are there electrical outlets in the front and back of each room?	____	____
22. Is the following equipment available?		
Sound motion-picture projector	____	____
Filmstrip and slide projector	____	____
Three-speed record and transcription player	____	____
Tape recorder	____	____
Radio	____	____
Television receiver	____	____
Opaque projector	____	____
Overhead projector	____	____
23. Do classrooms have adequate bulletinboard space?	____	____

	YES	NO
24. Are there rails or racks in classrooms to permit display of maps, charts, etc.?	____	____
25. Is there space provided for convenient storage of equipment when it is not in use?	____	____
26. Is there space for storage of materials which is open to teachers so that they can readily and easily check on materials that are available?	____	____
27. Are there facilities and materials that will permit teachers and pupils to prepare photographic pictures, handmade lantern slides, mounted flat pictures, etc., for class use?	____	____

Utilization of Materials

28. Have most teachers had courses in audio-visual instruction?	____	____
29. Do most teachers make regular use of motion pictures, slides, filmstrips, and recordings as an integral part of their classroom instruction?	____	____
30. Can all teachers operate the audio-visual equipment available?	____	____
31. Do teachers make use of field trips as an aid to developing better pupil understanding?	____	____
32. Do teachers make it a practice to preview materials before using them with a class?	____	____
33. Do teachers help pupils establish objectives for seeing the film before it is shown?	____	____
34. Do teachers frequently re-show materials when they feel that such re-showing will materially aid pupil learning?	____	____
35. Are audio-visual materials used in faculty meetings or by teacher study groups?	____	____
36. Are audio-visual materials used in PTA meetings or with other out-of-school groups to interpret the school program?	____	____
37. Are there books and magazines dealing with audio-visual instruction in your school's professional library?	____	____
38. Does your school have students trained to assist with the operation of audio-visual equipment?	____	____

QUESTIONS

1. What are the definitions for the following:
   a. Instructional aids?
   b. Visual aids?
   c. Audio-visual aids?
   d. Audio aids?
   e. Criteria?
   f. Evaluation?
2. What is the most important element in building an instructional program?
3. What are curbstone, or subjective, evaluations of visual aids?

4. What are the disadvantages of audio-visual aids?
5. What are the criteria for evaluating audio-visual aids?
6. What are the criteria for the measure of effectiveness of audio-visual aids?
7. What is a standard of performance?
8. What is the relation between objectives and a standard of performance?
9. What is an experimental type of research?
10. How are objectives measured in relation to standards of performance?
11. How are *results* measured against a standard of performance?
12. How should the advantages, or disadvantages, resulting from the use of audio-visual aids be presented to an administrator, or to management?
13. Why is it often advisable to use a "control group"?

PROBLEMS AND PROJECTS

(The following assignments are suggested for instructor use)

1. Each student should be given the task of setting up *objectives* for the type of training in which he is engaged or for which he is best adapted. These objectives should be determined for a specific instructional program.

2. Assign each student the task of setting up criteria for the selection and use of audio-visual aids to instruction. He should choose any *one* specific kind of aid and apply the criteria to it.

3. If time permits, assign each student the task of evaluating at least one audio-visual aid. This evaluation should include a statement of the objectives, the criteria, and the standard of performance. Evidence of the results of an experimental research technique should be measured against the established standard of performance. The findings, or conclusions, should be reported as a written project.

4. Each student should prepare an outline showing how he would present his evidence to administrators or management.

Planning to use audio-visuals in educational situations.

16

Organizing to Use Audio-Visual Aids

Nonclassroom Use of Audio-Visual Aids

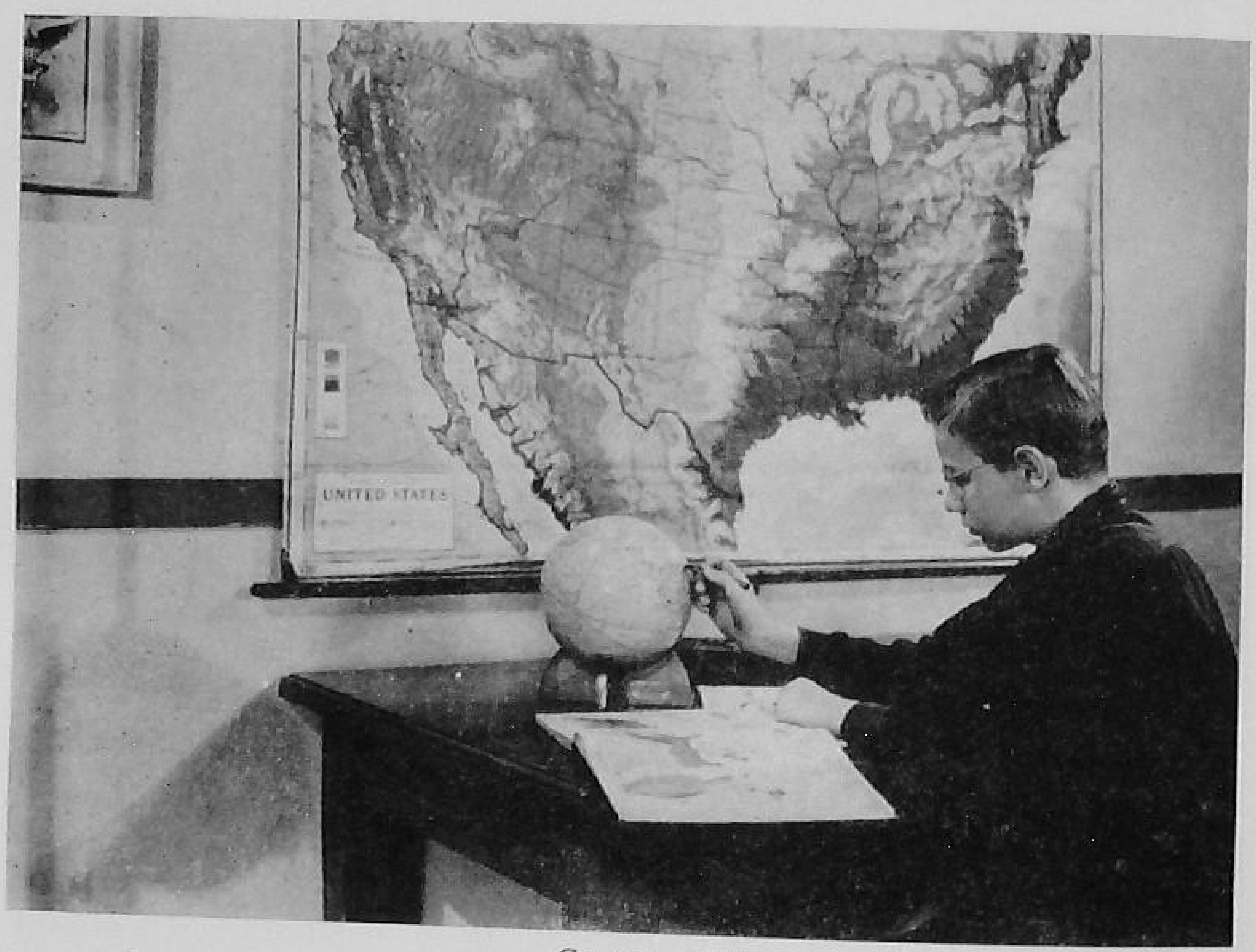
Socrates taught in the streets; Plato in a grove. Aristotle's school was called "peripatetic," because he taught while walking among the trees. The Stoics were named for the Stoa, or porches, where their classes were conducted. The Epicureans met in the gardens of Epicurus. The most famous teacher taught by the seaside and wayside. The world's greatest teachers have consistently shunned the formal classroom, and they have always employed such audio-visual aids as personal demonstrations and example, field trips, and the observation of natural and social phenomena.

All great teachers have loved the freedom, inspiration, and realism that were at hand in the way of audio-visual aids as they knew them. Had modern audio-visual aids been available at that time, doubtless those great teachers would have used all of them, because of their reality, scope, timing, and flexibility.

Religious, social, and civic organizations and schools have used nonprojected audio-visual aids for centuries. They now use projected audio-visuals, in addition to nonprojected types. And they are using them in unprecedented numbers. The motion picture and the slide film are

receiving most attention—and properly so—for it is likely that these devices can make the greatest contribution in non-school classrooms.[1]

It should be emphasized, however, that nonprojected audio-visuals should not be neglected in these areas. For example, blackboards, charts, illustrations, diagrams, posters, cartoons, books, manuals, pam-



Courtesy of Encyclopedia Britannica Films, Inc.

Using non-projected visual aids.

phlets, instruction sheets, samples, cutaways, mock-ups, models, sand tables, exhibits, and field trips should have a very large place in any audio-visual program.

These nonprojected audio-visuals are economical to make or purchase—often they cost nothing but a little imagination, time, and effort. A very small financial investment will help initiate a good audio-visual program in any civic, social, or religious organization, as well as in formal school classrooms.

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[1] See *Film And Education*, Godfrey M. Elliott, Editor, Philosophical Library, 15 E. 40 St., New York, N. Y., for details regarding the use of films in all of these areas of instruction.

How to Organize an Audio-Visual Program

Importance of a good start. Regardless of the kind of organization—religious, social, civic, or school—there is usually one person who "sparkplugs" the initiation of an audio-visual program. This person will usually guide the program until it is well established. Getting the program under way is, perhaps, the most difficult task, but experience indicates that if certain rules are followed a sound audio-visual program can be initiated. A good start is of primary importance and it is usually made by getting a good audio-visual committee.

Audio-visual committee. Appoint a good audio-visual committee, which should be small—three to five members are enough. The head of the parent organization should be an ex-officio member. The active committee members should be people who have a definite and lively interest in educational work, who command respect, and who are willing to work to accomplish things. Its chairman should be a person who is interested in, and who has a knowledge of, audio-visual aids.

In most instances, the audio-visual committee should be an offshoot of a parent board. For example, the committee should work under the organization of the council or board that has the responsibility for education. The parent board should delegate responsibilities and work to the audio-visual committee. In turn, the committee should make recommendations to the parent board. Estimates of cost, for example, would be made by the committee and the board would write this into the financial budget.

In most cases the Board gives the committee "power to act" within the scope of its audio-visual activities—and that may mean cooperation in offering counsel and guidance in every department of the organization, so far as audio-visuals are concerned.

Work of the audio-visual committee. The first job of the audio-visual committee is to inform itself concerning audio-visual education. It must know something about this work before it can plan. The place to start looking is on the local level. Find out what is being done in other churches, social, civic, and school organizations. If your national organization has a director of audio-visual education, write to him for literature. Subscribe to magazines such as *Educational Screen*, *Business Screen*, *See and Hear*, and the *Audio-Visual Guide*. They have special departments devoted to many organizations, including religious, social, civic, and school. Get some additional books on audio-visual education.

After intensive study, the audio-visual committee should next undertake a survey of the organization in relation to facilities, equipment, and the extent to which audio-visuals are currently used. This step is basic to good planning.

Begin by thinking and talking about materials, not equipment. Get

some good materials (including movies and slidefilms, as well as other aids), and show them to the people who must be influenced and who are important. Take some of the leaders in your organization to previews. If you can get their appreciation of materials, processes, and *results*, the money for equipment will be easy to get. It's only common sense—use audio-visuals to "sell" the audio-visual program.

After a good understanding of the meaning and implications of audio-visuals has been accomplished, and with the survey facts in hand, the committee should plan the future development of the project.

The Audio-Visual Plan

Making a plan. Now is the time to plan for using audio-visuals in educational situations. Unless a plan is studiously prepared and pursued, the audio-visual program is likely to be only mediocre, or a dismal failure. Audio-visuals have no inherent magic with which to change behavior patterns—there must be a planned program and the plan must be worked. In other words, as vocational educators would say: "Make a work plan, then work the plan."

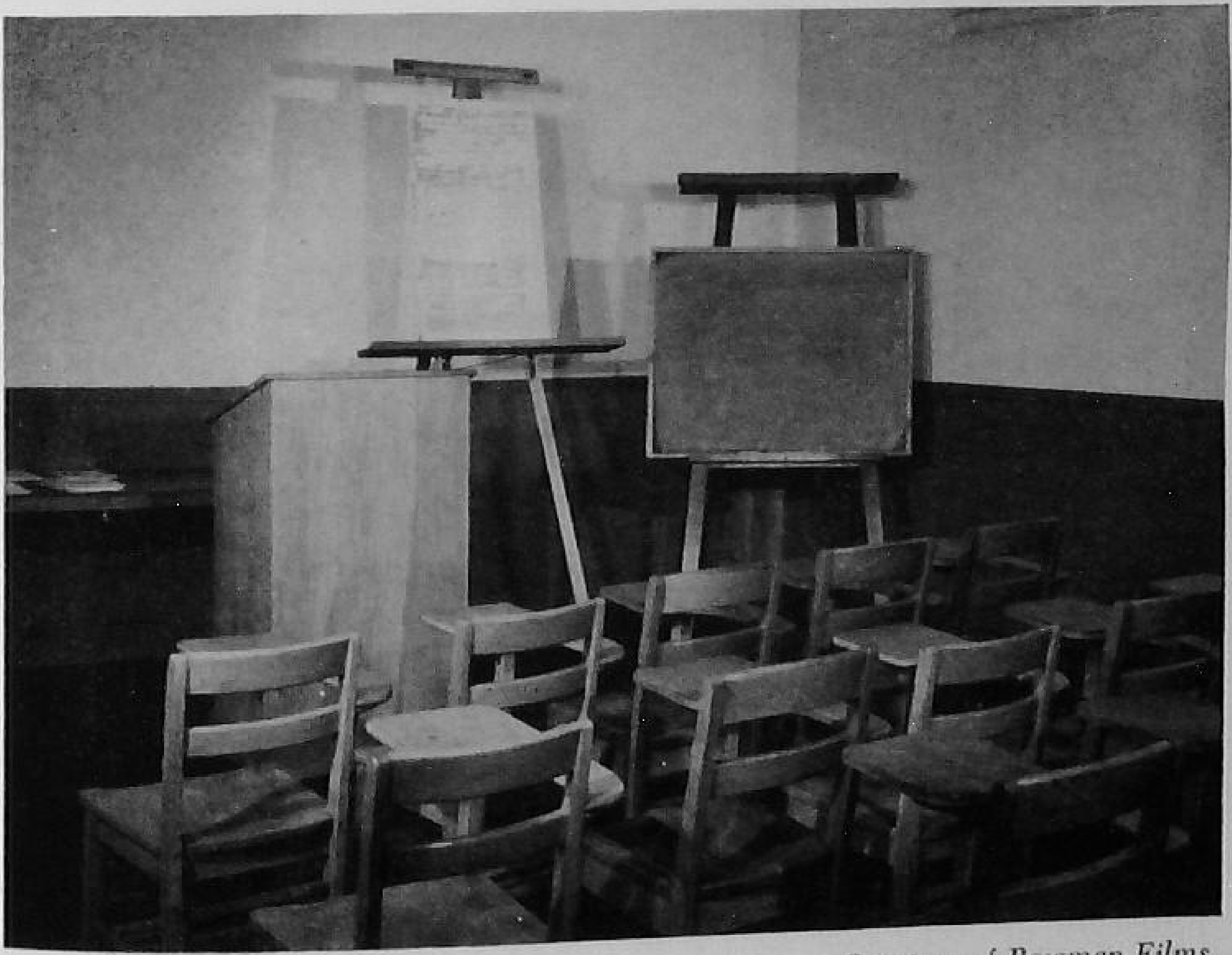
A workable plan must operate within the boundaries of certain principles that have the wide approval of key people in the organization. For most educational situations, the following principles will serve as a guide:

1. *It must be simple.* Any plan for using audio-visuals must be fundamentally simple; simple in construction, simple to present.
2. *It must be practical.* Elimination of an "academic" approach, and a well-planned method of presentation are necessary if the man hours to be used are most productive.
3. *It must be educational.* Not merely entertaining. The sole reason for using audio-visuals is to create, sustain, and make permanent the desired behavior patterns.
4. *It must be interesting.* Retention of subject matter will be greater when the program is interesting (not entertaining). It must also be interesting from the learner viewpoint, for each learner inevitably says to himself: "What's in it for me?"
5. *It must fit the organization's operation.* Instruction with audio-visuals must be conducted with a minimum of disturbance to regular organization services, objectives, schedules, or routine.
6. *It must have maximum support.* Audio-visual instruction without wide interest and support lacks the vital ingredient. All effective programs will have such support. In many organizations everyone is interested not only in giving support to the use of audio-visuals—they actually participate in it.

7. *It must be effective.* No audio-visual program, regardless of its simplicity, practicality, or interesting qualities, is worth anything unless it gets results.

8. *It must be personalized.* No audio-visual aid will ever supplant the warmth and liveliness of a good instructor. Mark Hopkins at one end of a log and an eager learner at the other remains the ideal training situation. The film must be personalized as much as possible so that it will approach a human training situation. Chapter 16, *Personalized Audio-Visual Instruction,* offers details about this topic.

9. *It should have scope.* Educational use of audio-visuals should not be confined to starters—orientation or indoctrination. Audio-visuals should also be used for teaching ideals, morals, spiritual concepts, attitudes, the improvement of humanity, and many other *practical* aspects of life—on a long-time, carefully designed basis.



Courtesy of Bowman Films.

Start with simple equipment.

Start where they are. Start where your organization is, not where you wish it were. Do not move too fast; do not break out into a sudden audio-visual rash. Utilize present interest to create more interest. Present new audio-visuals to create more interest. Help workers who are using audio-visuals to use them more effectively and encourage them to try others that are not too difficult. Do not expect a person who has relied on the spoken word to switch suddenly to moving pictures.

Encourage instructors to use easier materials first. Any instructor may feel confident about using the blackboard or posters to illustrate a subject; but he might not be competent to use a series of slides. Begin with simple nonprojected aids and devices. Start where they *are*, not where you wish they were. Then, go on to the more complicated aids and devices.

Include cost in budget. Most audio-visual programs start with special financing—a donation, a loan, a special fund-raising project. Regular budgeting of the cost of audio-visuals, however, should be a *must*. Audio-visuals do not pay their way. Blackboards, art classes, and electric lights do not pay their way. Audio-visuals should not do so either.

Charging for shows, putting on rummage sales, begging free materials is not good management. If audio-visuals are worth anything educationally, they are worth paying for as a regular budgetary item. Spending all of the budgetary allowance on equipment and then having to beg and scrape for money to rent films and other materials is bad management and bad instruction. Too many committees buy the "best" equipment and then try to beg and borrow free materials—getting little or nothing most of the time. In the meantime, the equipment will lie idle.

Selection and Purchase of Audio-Visual Aids

The audio-visual committee should select equipment, but its actual purchase may be the duty of another group, such as boards or trustees. When selecting, many questions should be asked.

In general, the one who is responsible for selection and purchase of instructional aids and devices will base his criteria and methods of evaluation upon rather earthy considerations. In the first place, he will be faced with a wide variety of widgets, gimmicks, and gadgets from which to choose. His problem is further complicated by the natural bias of the developers and salesmen of commercially controlled aids in favor of their own products. But the confusion of conflicting claims of merit can be dissipated with a little study, consultation, and experiment.

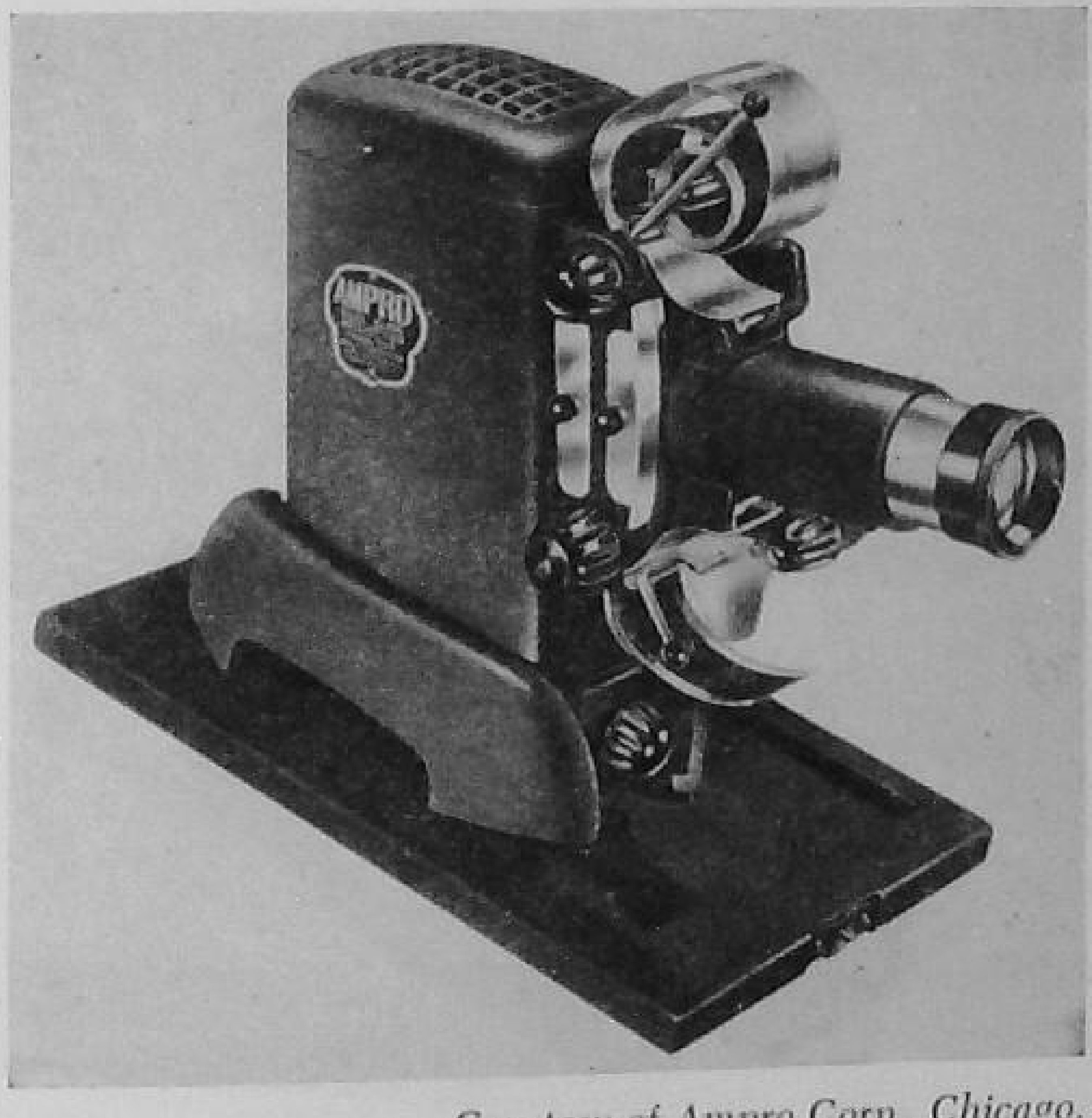
Naturally, the first thing to determine is: "What do we want our people to get out of the instruction?" Then you will try to select the type of aid best suited to the accomplishment of your purpose.

How will you know which is the best device to select? From the practical viewpoint, your budget may indicate the answer to that question. You might be limited to blackboards or charts—or you might be able to buy projectors, screens, and films.

It is important also to consider where the aid will be used. Complicated models and bulky or easily damaged aids may be good for use under controlled conditions in an auditorium, or in a permanent classroom, but they would probably not stand up under the rigorous treatment

they would receive while in transit from one room or auditorium to another.

The chances are that there are many audio-visual aids and devices already possessed by the organization—blackboards, for example. It would be sensible to put those aids and devices into active, productive use. In this respect the first thirteen chapters of this book offer practical details on how to prepare and use audio-visual aids. Chapter 14 gives details on *Evaluation of Audio-Visual Aids.* Chapter 16 gives details concerning *Personalized Audio-Visual Instruction.* The entire book stresses the use of easy-to-find, easy-to-get, and easy-to-prepare audio-visuals. A quick glance at these chapters will reveal many hints for audio-visuals that will cost little or nothing. And that is a good way to start—with *self-prepared materials that cost little or nothing.*



Courtesy of Ampro Corp., Chicago.

Slide and filmstrip projector.

Usually the first purchase should be a slide and filmstrip projector. Obviously a screen must also be purchased. Both of these devices can be purchased for approximately $100 or less. If the organization needs two or more projectors and screens, and they usually do, the cost would, of course, be double.

The next purchase might well be an opaque projector. It is advisable to purchase a combination opaque projector and slide. They are light in weight, easy to transport, and adaptable to a multitude of uses. The cost will approximate $250.

Opaque projector materials are plentiful and cheap. They are easily

readied for projection. There are unlimited materials in newspapers, magazines, book pages, maps, snapshots, and dozens of other sources. Nearly all articles of reasonable size can be projected easily to illustrate a point, and imaginative members or students can gain great pride of participation in the creation and projection of opaque materials.

The third purchase might be a movie projector. This may cost $500 or more, or films need to be rented and their cost will vary according to quality and quantity.

A suitable screen will be needed. It may be advisable to purchase a small wall-type or shadow-box screen, as well as a large screen. The large screen should measure one-sixth of the length of the room to be

Courtesy of Charles Beseler Co.

Combination opaque and slide projector.

effective. All screens should be beaded and, if portability is desired, mounted on a folding stand.

Both screens can be purchased for approximately $125.

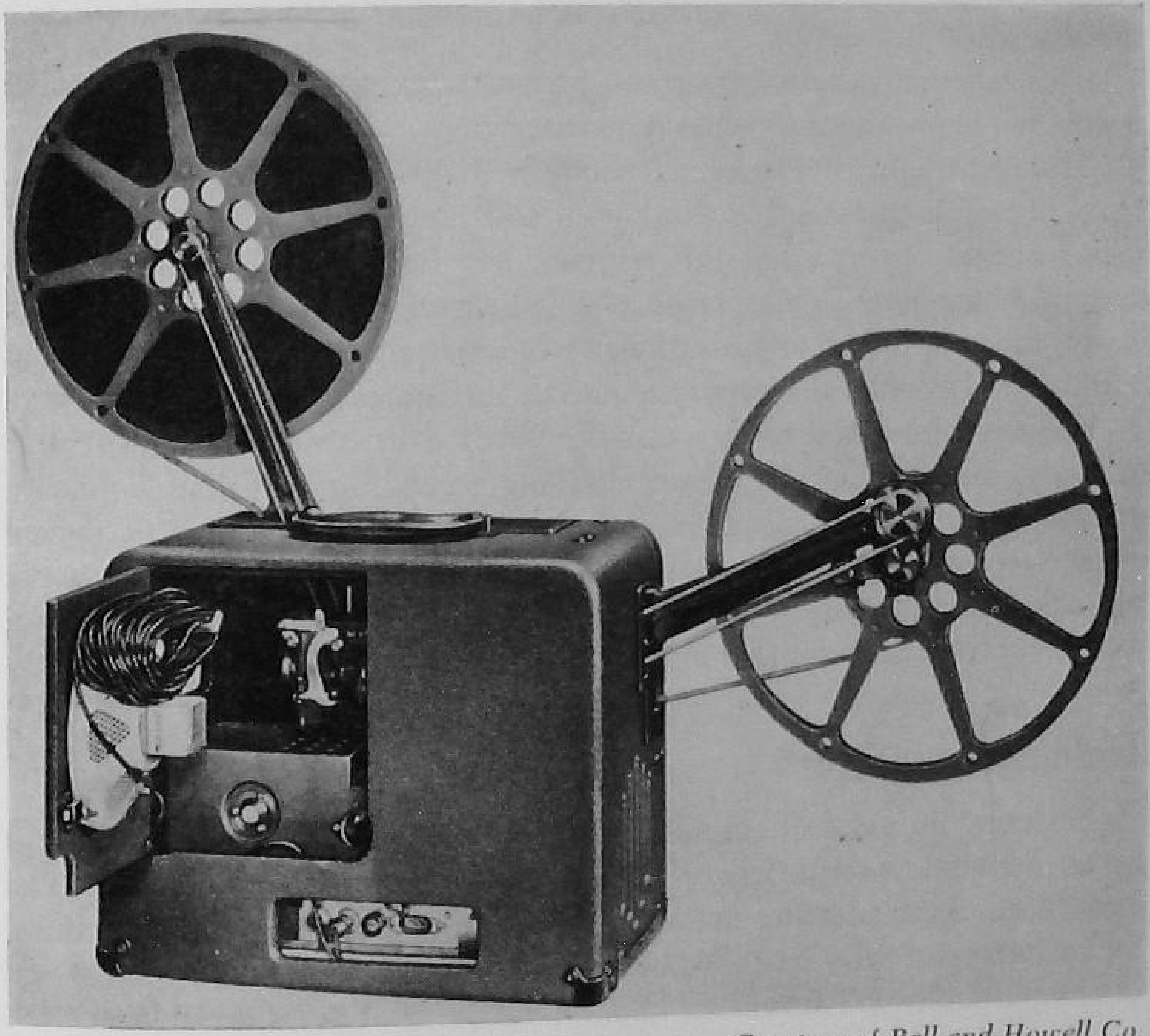
In time all instructional rooms should be equipped for audio-visual aids. Until then, one room should be attractively and properly arranged and groups brought to it.

Who should operate equipment? In each community, school, or organization, there are people who can operate equipment. Ability to operate devices, however, is not enough. The operator must be available —not out of town, nor in another organization. Someone must be available when needed on week-days, nights, and Sundays. Preferably, each

piece of equipment should have its own operator, and an apprentice. Each should be trained and tested by the audio-visual committee.

Quite often, the school janitor is able to set up the equipment, and is its custodian. Maintenance of equipment should be the duty of one person on the committee for audio-visuals.

Audio-visual facilities. This topic is discussed in Chapter 11, *Instructional Laboratory*, and in Chapter 17, *Personalized Audio-Visual Instruction.*



Courtesy of Bell and Howell Co.

Typical moving picture projector.

It should be emphasized, however, that makeshift equipment should not be used. Stands and tables for holding equipment, electric outlets, blackout drapes, and all other devices should be adequate. This is no place for undue economy.

Thus, largely within the limits of a budget, the instructional aids will be selected that:

1. Will do the best job;
2. Are tailored to the place where they will be used;
3. Can be operated by the instructors who will use them.

If there is still doubt as to the proper selection to make, perhaps a conference with sales representatives of the various devices may help toward the correct decision. And it is always good practice to try out various aids first, remembering always that no matter how clever or beautiful an aid may be, if it does not improve instruction and learning, it is a waste of money.

Consultant and booker. Each organization must have someone who will continuously review materials; who will keep up to date on new equipment and can serve as a booker for the various departments, groups, branches, and instructors.

This function is very important, for an organization cannot use what it does not know about or what it cannot find.

The consultant and booker functions may be given to one person. If so, his job is to assemble catalogues and lists [2] and to keep abreast of new materials by reading the reviews, articles, and advertisements in current magazines. This person could file reviews of films, attend previews, and visit other organizations to see material with which he is not familiar. He could also secure materials for the committee to discuss.

The consultant and booker can also check over curriculums, programs of study, and outlines, in advance. This procedure will enable him to make suggestions regarding the introduction of new units. This person must also keep in mind special days and events, and remind his people to book materials early. He will also need to help with bookings and act as the librarian of slides and films.

Training Instructors

Selecting an aid and carefully testing its effectiveness might seem to be an adequate precautionary measure. Unfortunately, it is *not.* The finest film, chart, meeting outline, or plan cannot survive poor handling by an instructor who has not been thoroughly trained in the skillful use of the particular aid furnished him.

Educational programs should begin with the training of departmental, unit, or group leaders, supervisors, and instructors. The audio-visual committee should prepare and hold a short training course for them. The first session (two hours) might include the examination of equipment that they could use. The second two-hour session might include showing of slides, filmstrips, and movies of materials suitable and avail-

[2] A minimum list of catalogues might include those from:
a. Association Films, 347 Madison Ave., New York 17, N. Y.
b. Ideal Pictures Corporation, 28 East 8 St., Chicago 5, Ill.
c. Society For Visual Education, 100 East Ohio St., Chicago 11, Ill.
d. Religious Film Association, 45 Astor Place, New York 3, N. Y.
e. Pilgrim Press, 14 Beacon St., Boston 8, Mass.
f. Young America Films, Inc., 18 East 41 St., New York 17, N. Y.

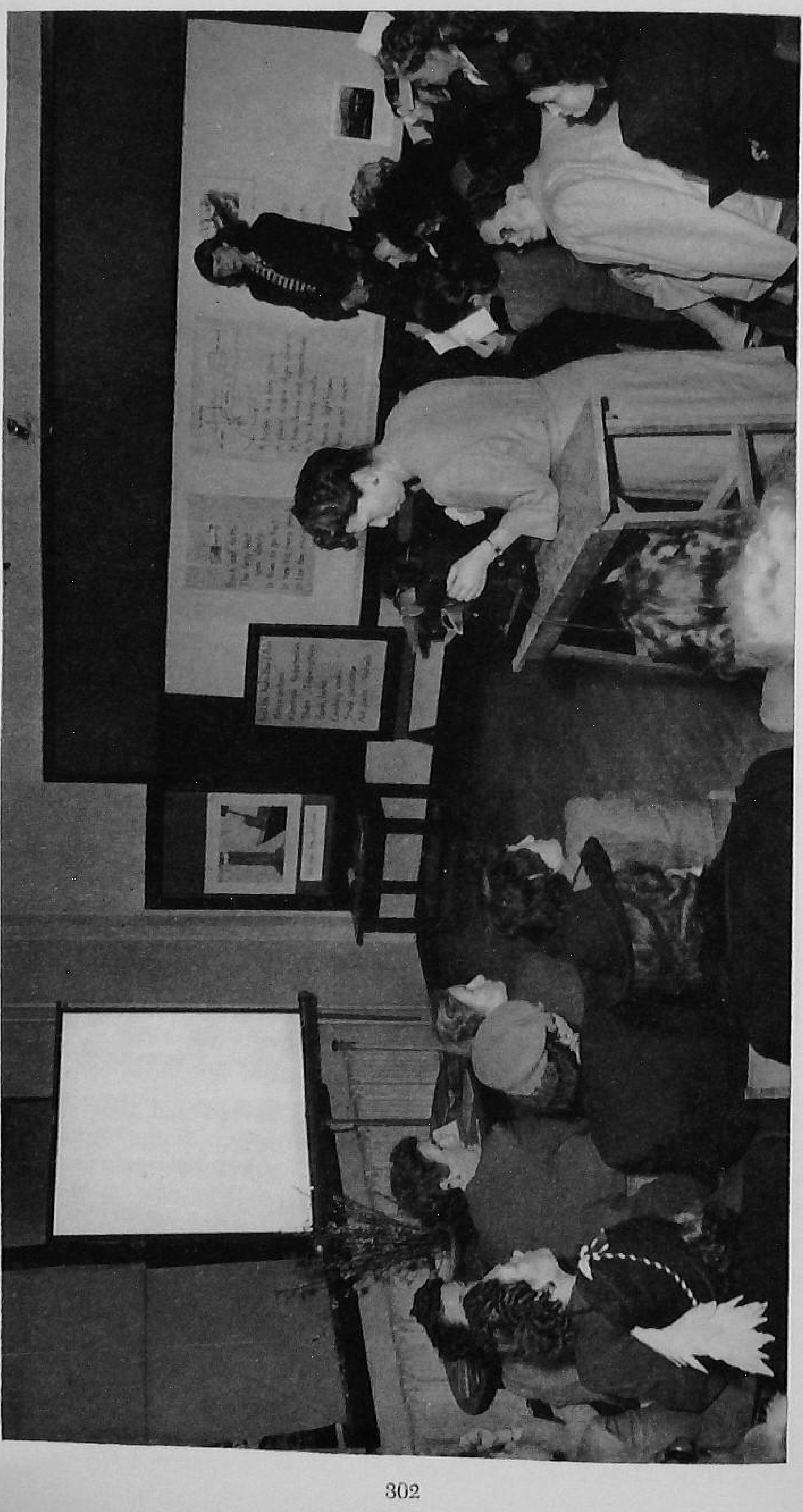
able. The third two-hour session might offer training that would help instructors to make the most effective, *personalized* use of audio-visual aids and devices.

QUESTIONS

1. How long have audio-visual aids been used?
2. Why are nonprojected visual aids of great value?
3. Why is a good start important?
4. Why should the creation of an audio-visual committee rank first?
5. What are the duties of an audio-visual committee?
6. What are the principles of a good, workable plan?
7. What is meant by "starting where they are"?
8. Why should the cost of audio-visuals be included in the budget?
9. Who should select equipment and materials?
10. What should be the first consideration before purchasing equipment or materials?
11. How will you know which is the best specific device to purchase?
12. Which kind of equipment should be purchased first? Second? Third? Fourth?
13. Who should operate equipment?
14. What is the value in having a consultant and booker?
15. Why should instructors, or teachers, be trained?
16. What should be included in teacher training?
17. How much teacher training should be given? What subject matter should be taught to teacher-trainers?

PROBLEMS AND PROJECTS

1. List the nonprojected visuals you would choose for an industrial training situation. For a civic or social organization. For a store. For a church. For a school. Estimate how much they would cost for initial use.
2. List the projected visuals that you would select to start an audio-visual program in an industrial plant, a store, a social or civic organization, a school, or a church. Estimate the cost of each and the total cost.
3. What criteria would you employ and how would you evaluate audio-visuals before purchasing them?
4. Prepare a detailed plan for installing an audio-visual program that would apply in each of the previously mentioned organizations. Consider an audio-visual committee, work of the committee, objectives to be attained, how objectives would be obtained, budgeting, purchasing, operation of equipment, consultant and booker, training of instructors.



Explanatory discussion preceding visual instruction.

Personalized Audio-Visual Instruction[1]

Effective Use of Audio-Visual Aids

Effective use of audio-visual aids in learning requires a skilled instructor, who will use appropriate audio-visuals for his particular subject at the right time and in the right way. In other words, he will personalize his audio-visual instruction.

An instructor must regard instructional aids as *aids*. Such aids are not intended to displace good instructional techniques. They are most effective when they are employed to supplement the personality and the teaching skill of the instructor and to assist student application and assimilation. Instructional skill that combines instructional aids and tested teaching techniques will create an unbeatable learning situation.

How to combine all of the elements that may result in the most effective kind of instruction—and learning—is the theme of this chapter. The technique to be presented has been thoroughly tested, improved, and refined, in many kinds of instruction and on many learning levels. *It has always been effective*—much more so than any other instructional technique. The principal reasons for this success are its brevity, simplicity, logical sequence, and psychological appeal.

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[1] Adapted from teacher-training material prepared by Dr. Kenneth B. Haas for the School of Business and Civic Administration, City College of New York.

This chapter is not offered as a complete treatise on methodology. Its primary purpose is to remind instructors of some of the possibilities for improvement of their over-all instructional techniques.

Tested teaching formula. A good instructor will prepare and follow a practical formula or outline. Here is a practical, tested plan, or formula, to guide you in conducting your class meetings. The key points are:

Your preparation	Examinations and tests
Your presentation	Summary and close
Helping students apply and assimilate	Remedial instruction

Your preparation. There are six things an instructor should do to prepare himself:

1. Estimate what is to be done and state objectives.
2. Analyze and select subject matter.
3. Plan the lesson.
4. Have everything arranged.
5. Rehearse.
6. Check appearance and mannerisms.

Your presentation

A. *Introduction*

1. Greet students and put them at their ease.
2. Arouse group interest and create attention through use of humor, striking observation, dramatic illustration, anecdotes, colorful vocabulary.
3. State objectives and purpose of meeting.
4. Relate to previous instruction.

B. *Explanation and demonstration*

1. Present material step-by-step, clearly, patiently, and in sequence.
2. Stress important points.
3. Present no more than student can master.
4. Use example, comparison, and contrast.
5. Illustrate with visual aids.
6. Accompany throughout with explanation.
7. Make it short, simple, and realistic.
8. Set a high standard of performance.

Helping students apply and assimilate. No one can learn unless he is allowed to apply, practice, and assimilate what he is being taught. Therefore

1. Have the student perform the skill, apply the information or adopt the attitude that has been presented.
2. Constantly observe and correct him.

3. Give remedial instruction when necessary.
4. Ask questions.
5. Hold discussions to clarify and assist students to assimilate.

Examinations and tests. The instructor may use written objective or essay tests, or employ oral quizzes in this step. The purpose of examinations is to determine student understanding and ability and to serve as a check on the instructional ability of the instructor.

1. Have student perform without assistance.
2. Test understanding as well as memory.
3. Check student ability to use the training under varied situations.

Summary and close. To clarify and point up instruction,

1. Provide over-all viewpoint.
2. Indicate strong and weak points.
3. Preview next related instruction.
4. Discuss—questions may be asked.
5. Assign projects.
6. Close meeting by expressing appreciation for student attitude and cooperation.

Remedial instruction. Remedial instruction literally means follow-up of student learning. The training process is not complete without this element. The steps involved are:

1. Observing the student.
2. Rating the student.
3. Retraining of student when necessary.
4. Commending the student for good work.

Your Preparation [2]

Your instructional plan. The aim of a good class instruction is to help students learn more in less time. From experience we know that planning and preparation are the keystones that make a learning situation productive as well as interesting. This chapter presents the how-to-do phase of conducting successful instruction. It is designed to help you make your class sessions more successful.

Instruction that pays off cannot be plucked out of the blue sky, or cooked up on the spur of the moment. But there is not much difficulty in conducting a good class session when a good teaching plan is used.

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[2] See *Tested Training Techniques*, by Kenneth B. Haas and Claude H. Ewing, Prentice-Hall, Inc., New York, N. Y., 1950, for additional details related to modern instructional methods.

A carefully prepared lesson plan, teaching plan, or *planning sheet* is an absolute *must* for good instruction.

A *planning sheet* suggests a development plan or outline that allows full opportunity for free expression. Instructors can use their own words when they prefer. But a good plan or outline *must* be used if effective instruction is to be done.

Planning sheet form. All good instructors use a planning sheet (lesson plan) for instruction. Many forms and arrangements have been created for planning class instruction and many of them are good. Experience in many schools, however, has indicated that one particular form is likely to be most effective. The following form should be completed by each instructor and, when feasible, inspected by his supervisor before a class presentation may be made. This form is adaptable to any topic or subject.

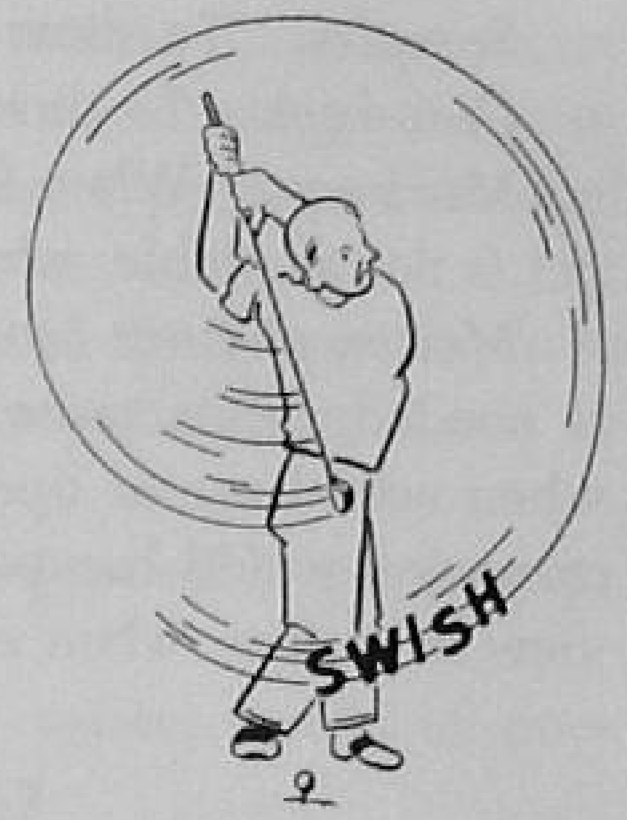
PLANNING SHEET

Unit or Department____________________

Subject____________________ Total Hours______________

Date	CONTENT	No. of Hours	Instructional Aids: Reading Assignments	Methods	Demonstration	Tests Exams	Visuals	Reports	Field Trips	Speakers

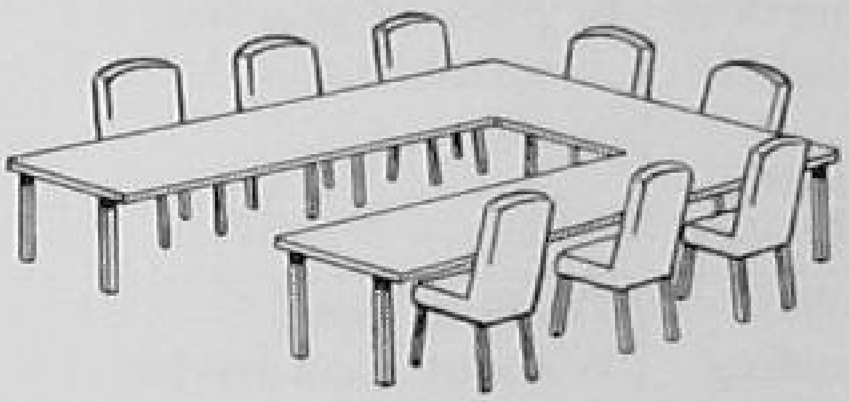
Be a professional. Personal preparation is the professional secret of a class session. Your degree of success is ALWAYS in ratio to what you do *before* the meeting. Remember, preparation also means rehearsal!

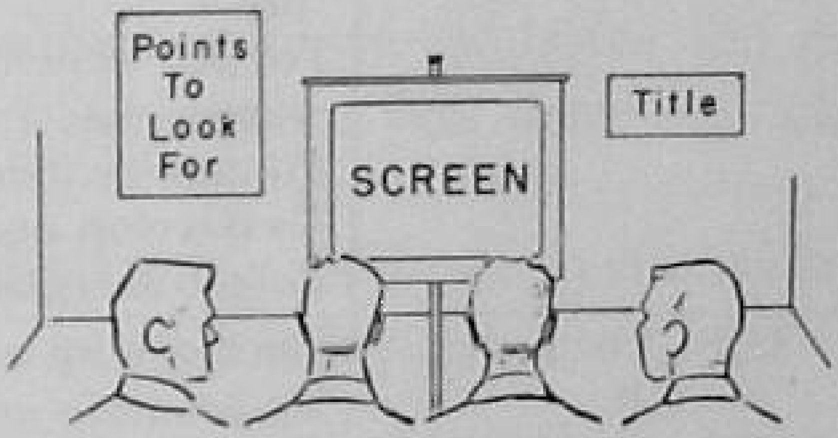


Results measure the job we do. The amateur takes things for granted, or is too smart or lazy. The "pro" knows that details can spell the difference between a good or bad meeting. A "pro" follows through.

The room

1. Arrange enough chairs so all can see and hear.
2. Check lights, ventilation and other details.
3. Aim for undivided attention. You lose *every time* you compete with disturbances or distractions.



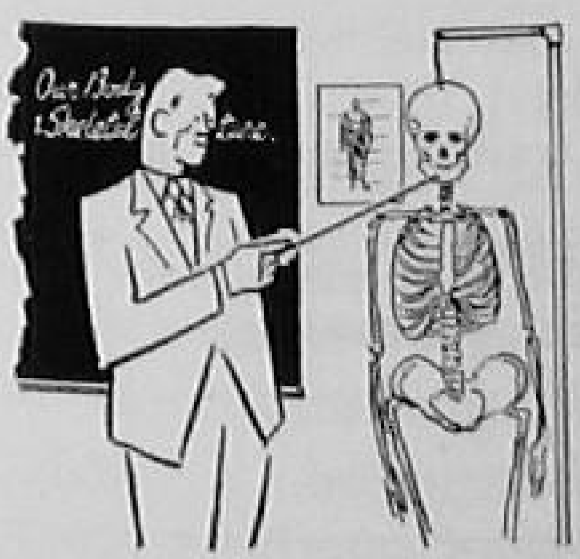


The props

1. Put charts and screen in place.
2. Expose charts just as they are needed.
3. Check projector.
4. Arrange other visual aids and devices.
5. Review planning sheet.

Select the most effective aid

Blackboard. For sketches, diagrams, outlines, definitions, directions, summaries, and assignments.



Charts, illustrations, diagrams. When trends need to be emphasized; when processes are important or comparisons are needed; when figures or statistics predominate.

Posters, cartoons. To arouse interest, attract attention, give directions, inspire.

Books, manuals, pamphlets, instruction sheets. For standard information and guidance, reference, and background. (May be used to supplement or aid the discussion.)

Samples. To show the real object.

Cutaways. To show structure and relative position of opaque objects.

Mock-ups. When finished assembly covers parts, when finished product is not available, when safety is involved.

Motion pictures (sound or silent). When over-all view or impression is needed; when noise of actual operation would prevent explanation; when actual use or operation of product is at a distance; when viewing operation would hamper production; when it is safer to get preliminary view from film; when entertainment is the keynote.

CHOOSE YOUR METHOD

METHOD	YES! USE IT	DON'T USE IT
CONFERENCE	To get opinions and ideas. To encourage group thinking. To get benefit of previous experience. To modify opinions. To develop understanding. To get acceptance.	Unless people are already informed about subject. As initial training. In place of practice.
DISCUSSION OR DEVELOPMENTAL	To warm up or review. To promote understanding. To give reasons. To emphasize factual material. To make people think.	To fill in time. Without good leader. To present new material. In place of practice.
DEMONSTRATION DRAMATIZATION AND FIELD TRIPS	To show a manipulative operation. To clarify principles or theory. To show use of equipment. To orient and explain.	When note taking is required. In place of practice. To kill time.
PRACTICE AND DRILL	To develop performance skill. To help in retaining information, knowledge, understanding.	On a theoretical problem, but only on a real one.
LECTURE	When presenting informational material or explaining a process. Supplemented by visual aids.	For material with many details. For training in a skill.
READING	Sparingly to emphasize exact wording. As an *aid* rather than an acceptable basic method.	As the basic method for conducting a meeting.

Filmstrips or slides (sound or silent). Where motion is not important or not required, sound slide filmstrips can be used to advantage. Training and supervision fields are well covered with this type of instructional aid. Superior for most types of training.

Overhead and opaque projection. Where all of the group needs to look at the same drawing or chart at same time and leader wants to focus attention on a specific point at one time.

Models—small scale. Permit operation without using large quantity of material, make large operations visible.

Exhibits. Show finished products, causes of waste, results of poor workmanship, effect of breaking safety rules.

Field trips. Orient students and provide overview of entire plant or industry; correlate with other studies and activities; practical demonstrations with real situations.

Choose the best method. There is usually *one* instructional method that best fits the presentation to be made, as well as the personality of the instructor. Sometimes a combination of methods are needed. Be sure to choose the best method or combination of methods for the presentation of your subject. Make the choice before you enter the classroom.

The methods most commonly used together with suggestions as to how they should be used are listed on the opposite page.

Your Presentation

Introductory remarks. Skip the usual apologies and explanations. Start the meeting with a bang. Quickly set the stage and get attention. State your purpose and objectives to point up importance and interest to the students. Objectives are guides in preparing your meeting and indicators to measure effectiveness of it.

Your introductory remarks should make the student want to learn. Show him the plus factors and dividends. Give him a quick run-through on what the remainder of the meeting will consist of and how he will benefit. Do not forget to state that an oral quiz is in the offing. Tell him the answer to his unspoken question: "What's in it for me?"

Be a ringmaster. Remember the ringmaster at the circus? He pointed out the interesting facts. He focused your attention on important highlights . . . he turned bewildering confusion into enjoyable order. His *expert* guidance helped you follow everything of interest and importance that was going on.

The same is true with an instructor. With the problems to be solved: the habits, skills, information, knowledge, and understanding to be developed; with colorful, exciting subjects to exploit—all of the elements of showmanship must be used.

Your speech. Speech is an instructor's chief tool. Be natural, be at ease, be poised—then your students will be at home with you.

Control your voice. Watch pitch, volume, tone, modulation, and rate of speech. Enunciate clearly. Use a good choice of words. Be sure enunciation and grammar are correct.

Employ good diction—appropriate choice of words and proper construction. Build a colorful, descriptive vocabulary. Use a few anecdotes, illustrations, dramatizations.

Your appearance. The first impression that your students receive is a visual one—your appearance. You must be well groomed and appropriately dressed. It is wiser to err on the side of conservatism in dress than on informality, for conservatism cannot offend.

Your mannerisms. Yes, we all have mannerisms. Avoid them as much as possible, since they distract attention. Such gestures as finger pointing, pounding the desk or hand, pacing the floor, finger snapping, fussing with a pencil or jewelry, adjusting clothing—are habits to overcome.

Be businesslike. Start class sessions on time, check attendance swiftly, conduct it in an orderly, informal manner. These things impress the group with the value of the session and with your ability. When you are through . . . STOP!

Other ways to arouse group interest. Refer to a current news story, an advertisement, or motion picture that is related to the topic under discussion. Refer to a school activity or a related course. Mention main points of last meeting. Ask a thought-provoking question. Make a challenging statement.

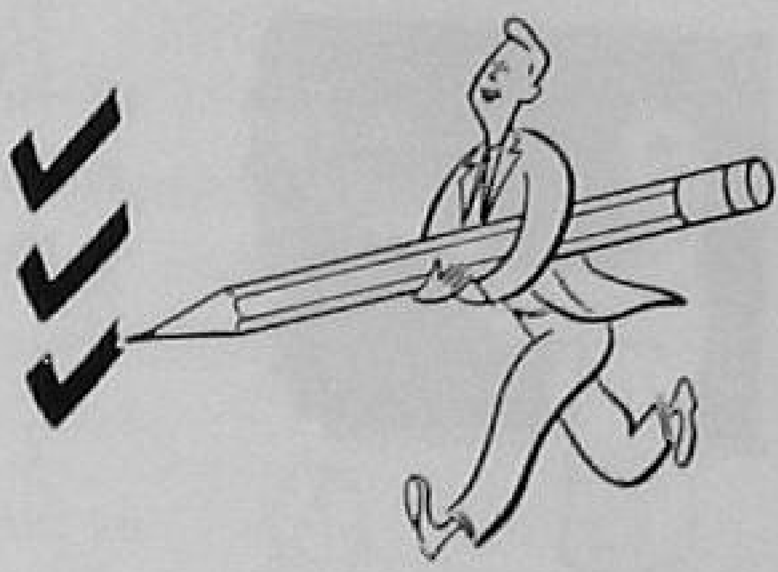
Use actual cases and vivid oral illustrations. Make students participate by giving demonstrations and talks. Be personally alive, vital, dynamic. Use visual aids *whenever they may be useful.*

Check yourself. Here is where you do your actual teaching. Check yourself on these points:

Smile—it's standard equipment.

Enthusiasm—it's contagious.

Show more—tell less.



Eye contact—it traps attention and controls the individual and the group.

Voice—change pace to keep your listeners alert.

Participation—it makes instruction meaningful.

Dramatize—be a showman.

Be logical—use your planning sheet.

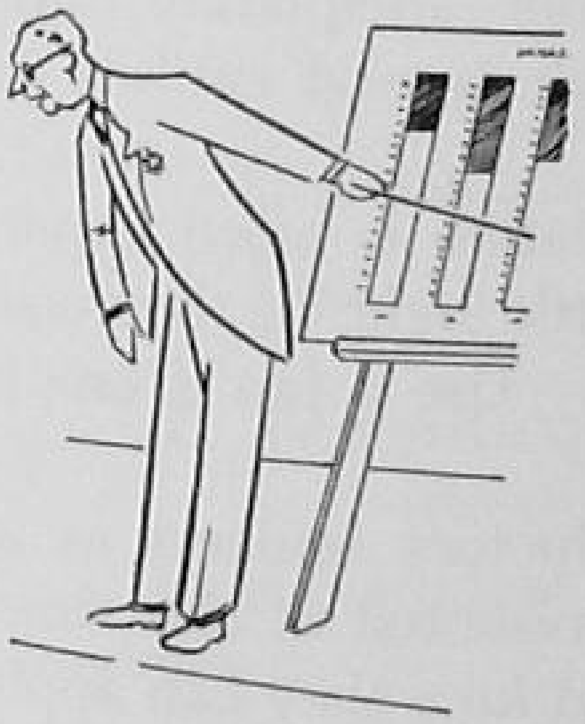
Lincoln said, "Be sincere . . . be simple . . . be seated." For your job add:

Be prepared
Be enthusiastic
Be *clear*
Be brief
Be yourself.

Handling audio-visual aids

If you use charts.

1. Talk to the students—not to the chart. Facing your group compels attention; turning your back breaks contact and shatters attention.



2. Be sure everybody can see the chart.

3. Use pointer and indicate what you are talking about. It helps to hold attention and it makes for easier following.

4. Go through the steps on the chart the first time at a good pace. Just give the continuity or progression. It will set your presentation on a good foundation on which to build later.

5. It is your painting of the picture and procedure that your students will buy, so make it the best. Pound home the essentials. Work in extras and interest items. Hold to a good common-sense approach in answering questions and explaining difficulties during discussion.

6. Select a student and have him explain important points in his own words. Select a second student and have him do the same.

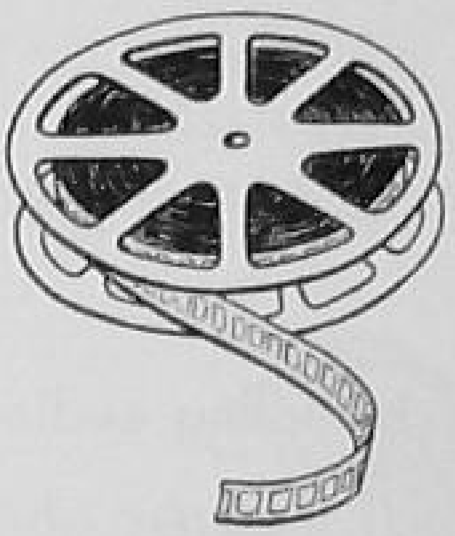
7. Congratulate and start a "hand" for these students. Theirs was the rugged job of breaking the ice. Now you are sure of your class.

8. Develop and stress important points.

Using the blackboard. The blackboard helps to bring out strong points and things for the student to remember. Don't block the view. At the board keep these four things in mind:

1. Print or write legibly, but quickly.
2. Stand at the side of your work as much as possible.
3. Talk while writing, but not to board.
4. Use like chart presentation when possible.

Handling the training film. There is much more to a successful film showing than merely flashing it on the screen and hoping for the best. While few instructors can have a Billy Rose touch, a certain amount of showmanship is possible by thoughtful arrangement beforehand.



Preview the film. Become familiar with it.

Plan introductory remarks. Use your own lead based on your preview of the film. Decide how to inform your students.

(1) *What* the film will show;
(2) *Why* it is being shown;
(3) *What* they are expected to get out of it.

Arrange necessary equipment. Prepare the room—adequately darkened—extension cord—ventilation—everything. Don't depend entirely on another person for these things.

Secure desirable room conditions. Good ventilation is more important than total darkness. It is better to have a little light in the room than to have the students uncomfortable or asleep. Use a fan if one is needed.

Prepare students to see the film. Make introductory remarks as to *purpose* of the film; *what* to look for; *why* it is presented at this time; *what* they will learn from seeing and hearing it; and *how* they can apply the information gained. Why they will benefit from seeing it.

Project the film. A good instructor knows the value of giving the same attention to the film as is expected of the students. Don't leave the room, even though you have already seen the film, or an operator is present.

Handle trailer frames. When available, consider and use the trailer frames as charts. Work in a semilighted room. Encourage questions—get answers from group. Discuss points not clearly understood.

Summarize. Never neglect to summarize the main points presented in the film. Then—thank the group for their attention and interest.

Student Application and Assimilation

Discussion. Application and assimilation means directed student activities that insure stepped-up interest, learning, and follow-through. A good discussion will help students to apply and assimilate.

Prepare and present material skillfully and your students will taste success in discussing it.

Select a student and have him explain procedures, facts, information, skills, and attitudes to the group. Discuss questions. Stick to the subject. If the meeting gets off the beam, bring it back immediately.

Demonstrations. Learning by doing through student demonstration gains active participation. It assures interest and increases your return, because it is *learning by doing* through *trial and success*.

Good demonstrations are handled as follows:

1. Have everything ready and arranged. This includes the right props. Be sure that they are in good condition and ready to use.

2. Use the following proved method to demonstrate how to perform a skill, acquire knowledge or information, or adapt an attitude.
   a. Prepare students and get them in the right position to see and hear.
   b. Present your material step by step; stress key points.
   c. Let students explain what they are doing as they practice.
   d. Test with questions, beginning with what . . . how . . . why . . . where . . . when . . . who.
3. Select student for demonstration. Congratulate him when he completes it.
4. See that demonstrations move along—don't let them drag. If your students do not assimilate your demonstrations or instruction—do it over again.
5. Ask questions and get answers.
6. If the student doesn't learn—you haven't taught!

Here is how to ask questions. Questions are a part of the application-assimilation step. Sometimes it is not easy to get a response from a group. The students may not understand the question. They often find difficulty in organizing their thinking and putting it into words. Over-

come this with the habitual use of questions. Use questions to introduce a topic. Use questions in the middle of a topic, if necessary. Use questions at end of presentation.

How to conduct a field trip. Few instructional programs are complete without a field trip. Properly organized and conducted, a field trip has tremendous advantages for certain subjects. When poorly handled, it is a waste of time and money.

Here is how to organize and conduct a good field trip:

1. Avoid "spur of the moment" trips.
2. Plan each detail of the trip carefully.
3. Prepare guide sheets for each trip.
4. Make sure the guide knows what to show the group.
5. Prepare students for the trip: tell them what the objectives and rules are.
6. Follow plan as outlined in guide sheet.
7. Correlate trip with specific training job.
8. Prepare and use visual aids applying to trip.
9. Test the students.
10. Evaluate and test results of each trip.

Quizzes, Tests and Examinations

The first question an instructor must ask himself as soon as he knows that a quiz, test, or examination is to be given is, "What am I trying to measure?" In answering this question he must know what he expects his students to master as a result of his instruction. And he should aim to determine how well *he has* taught through the use of tests. In this respect there are three types of measurement—short quiz, performance test, and written examination.

Handling a quiz. An occasional short written or oral quiz is very beneficial and desirable. The following suggestions have proved of value for instruction in practical situations.

1. Conduct warm-up session. Ask students to give quickly some of the key points of the meeting.
2. Add some questions of your own to suggest a quiz contest if you desire, but keep them simple.
3. For a flash check, use a simple oral Yes-No or True-False quiz. A simple check-mark answer is even better. Have students mark an-

swers. Do not collect. Swing quickly around the group, or at random, ask a student to read a question and give the answer.

4. Get quick check on number with correct answer. Good number of hands means the point in question is clearly understood. If only a few hands show, you may need to elaborate a little to be sure the students have a clear understanding of the point you want them to retain.

5. Perhaps have one of the students get names of those who had all questions correct—then comment.

Performance tests. Performance tests measure how well a student can perform a given piece of work. He is required to make, repair, service, operate, shape, assemble, or disassemble something. The student is checked on his speed and accuracy. The purpose of performance tests, many of which are clearly related, include the measurement of:

1. Skill and information
2. Ability to apply knowledge
3. Ability to solve problems
4. Aptitude for training.

Written examinations. Written examinations can be classified into two main forms, essay and objective.

The essay type of examinations consists of broad questions or statements followed by directions to "discuss" or "explain" the problem. Such questions force the student to recall and logically express all that he knows about the question.

Objective questions are characterized by two things: First, they require the student to do little or no writing—he does not "express" himself at length. Second, they enable the instructor to score answers quickly and confidently, since they largely eliminate errors of judgment in determining whether the answer is right or wrong.

Each type has its *specific uses*, and these should be clearly recognized and considered by the instructor when he constructs his tests.

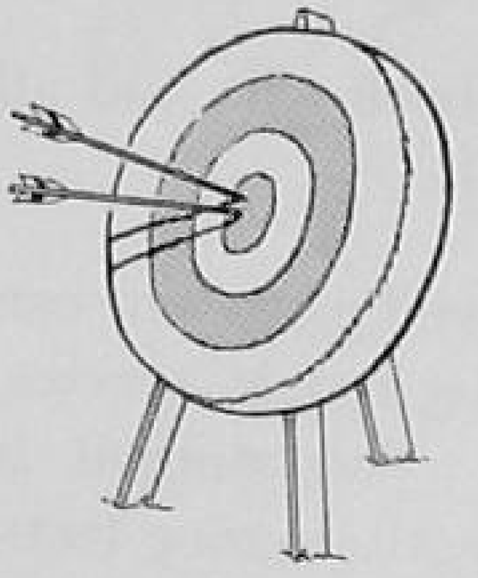
Phrasing questions. The phrasing of a written question, whether essay or objective, should leave no doubt in a student's mind as to what is required. Vague or ambiguous questions should be eliminated before a test is given. A good way to do this is to try them out on other instructors or on students to see whether the question as stated is clear.

Test items should not stress mere memory. Catechismal instruction that stresses the blind, meaningless recall of passages verbatim may lead to absurd results. For example: (1) "What should be done whenever possible?" The answer was: "Students should work whenever possible." (2) "How should a business be financed?" The question had a perfect

answer: "With great care." (3) "What do you want to be 10 years from now?" The answer: "A millionaire."

Summary and Close

Summarize your unit of instruction quickly. Define your action. Nail down key points. Your target is an effective use of the information and know-how. Weave and throw a punch line of encouragement to end the meeting. Remember a good close builds and sparks the ensuing activity on the job.



Handling questions. In your introduction to the meeting you mentioned that questions would be asked at the close of the session. Now is the time to fulfill your promise. There is a good technique to employ when questioning students. First, be sure that your questions will be effective.

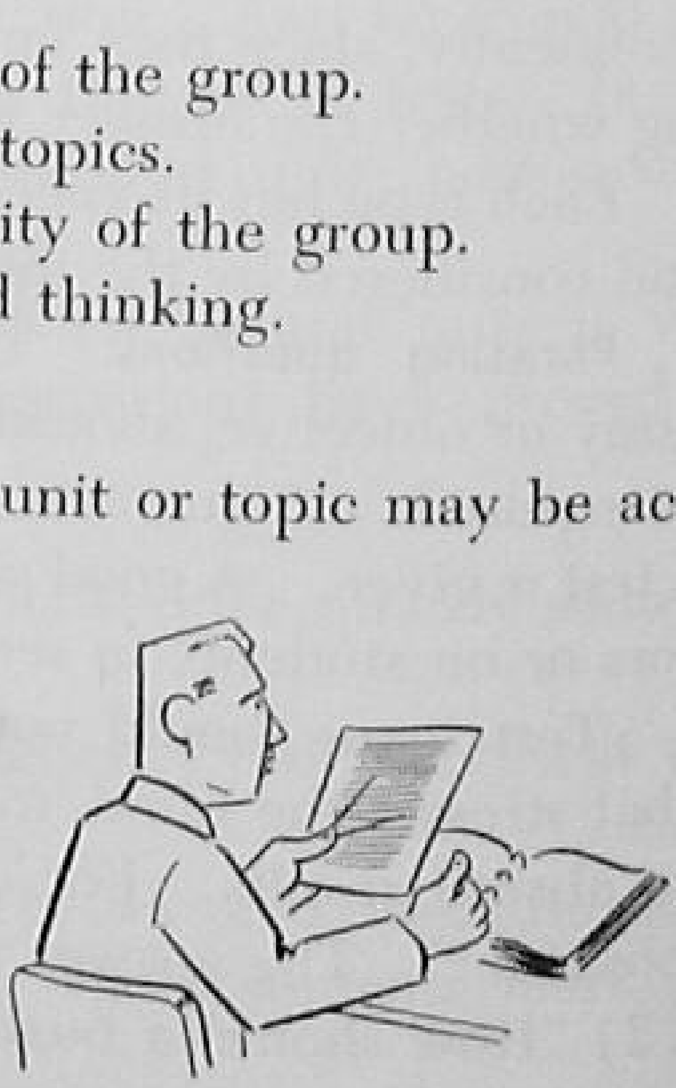
Effective questions always have the following characteristics:

1. Specific purpose
2. Subject to only one interpretation
3. Clear-cut and understandable
4. Require definite answers
5. Stimulate thought as well as test memory.

How to use questions is important.

1. Use the four step method:
   a. State the question
   b. Pause
   c. Ask a specific student to answer
   d. Listen carefully to the answer.
2. Distribute questions among all members of the group.
3. Group questions around central training topics.
4. Select questions that conform to the ability of the group.
5. Use questions to stimulate discussion and thinking.
6. Use good English in asking questions.

Take-home piece. The presentation of each unit or topic may be accompanied with "take-home pieces." These "take-home pieces" should contain a summary of the class meetings. The sheets should be punched and prepared for a binder. Students should be encouraged to study their binder content at frequent intervals after the instructor ends, and to add it to their home library.



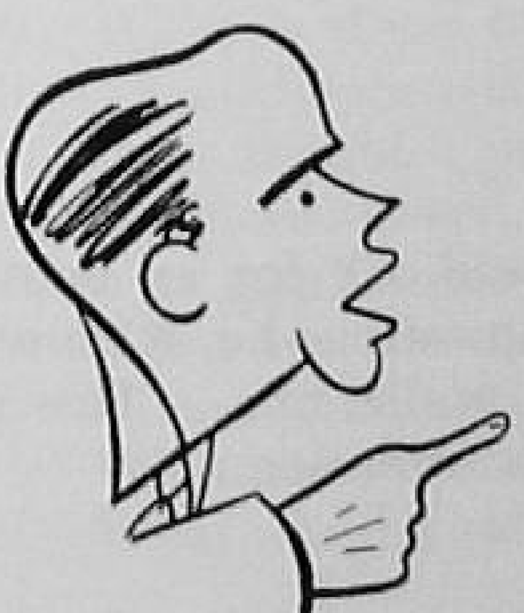
Students should also be encouraged to collect and add more materials.

Always commend the group for their attention and interest.

How to Handle Problem Students

The vast majority of students are conscientious, alert, hard-working individuals. They are a joy to teach and the chief recompense in the life of an instructor. Sometimes, however, one, and possibly two, "characters" may enter a classroom. These problem cases can ruin an otherwise good learning situation. How to handle characters has always been a problem to many instructors. The following procedures should help instructors solve this kind of classroom problem.

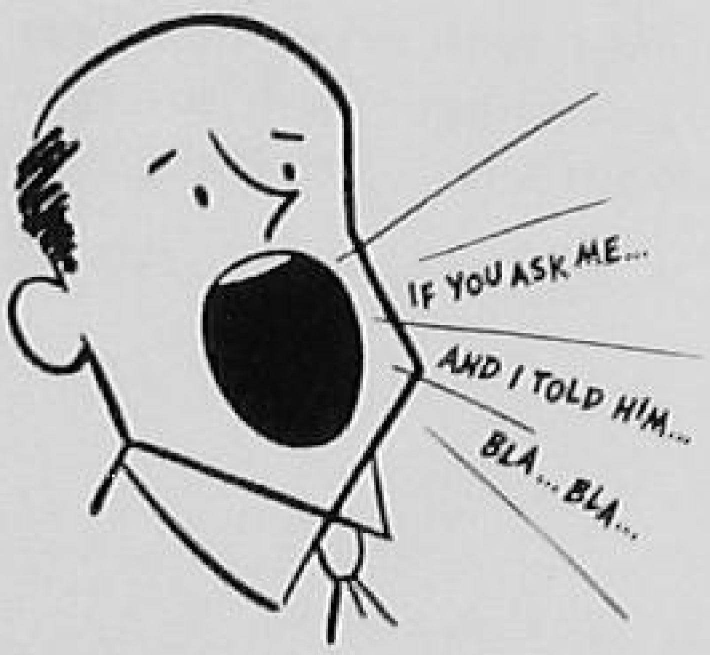
SITUATION	*RECOMMENDATION*
The *KNOW-IT-ALL*—wants to impose his opinion on everybody else.	Check on his opinions with other members of the meeting. Encourage them to comment on his remarks freely. Let the group take care of him.
The *ARGUER*—constantly tries to cross you up. He quibbles over trifles. He loves to "get the other guy's goat." He wants your opinion instead of giving his own.	Keep cool. You can never "win" an argument. Always make him back it up. Check off other members' opinions and turn them back to him. Avoid getting personal. Refer the question to the group and then back to him. (Give him the hot potato treatment.)



The *ALL-AMERICAN*—cock-sure of himself—resents being told how.

Get him to feel that his experience may be valuable to others. Ask him for an opinion and let the group determine its worth (and pin his ears back).

The *MOUTH*—wants to do all the talking.



Take the play away from him by asking others to comment on his remarks. Tactfully ask him to refrain from talking and to give someone else a chance. Check yourself on this, for it may be more effective to have a private talk with this fellow.

Fail to recognize him.

Deliberately turn to other individuals and ask for their opinions.

The *MOUSE*—is in every group . . . he's shy.

Call him by name and ask for an opinion. Ask him an easy question—he is sure to answer well. Then praise him. This person is worthy of your attention.

The *SO-WHAT-ER*—is disinterested.

Point up something he has done as a good example. Ask direct questions affecting his work.

Outside of the class meeting, ask his advice pertaining to some features of the meeting.

Bring up things in which you know he is interested.

Self-Evaluation

At frequent intervals, an instructor should make a self-evaluation. In other words, he should make an appraisal of himself and his probable instructional problems.

An appraisal of an instructional situation will involve these five major divisions: classroom, instructor, students, lesson, and summary.

Page 320 presents a useful self-appraisal form that has been helpful to many instructors. This form may also be used by supervisors to appraise the quality of instruction, and when used in that way it should encourage more effective procedures and result in more productive training.

A below-average self-appraisal should serve as a red flag—an indication of danger and a revelation of the need for better instructor preparation. An above-average appraisal should serve to spur on the instructor to an ever-better performance.

QUESTIONS

1. Why does effective use of audio-visual aids require a skilled instructor?
2. What are the key points of the tested teaching formula?
3. Why do you believe it is necessary to employ this formula?
4. Why is a good lesson plan an absolute *must* for good instruction?
5. What is contained in a good lesson plan?
6. What is done to prepare to teach in relation to the room, "props," selection of audio-visuals, methods?
7. How should a presentation be introduced?
8. Why are speech, appearance, mannerisms, and a sparkling personality important to good instruction?
9. What are the miscellaneous ways to arouse group interest?
10. Why should an instructor be logical and sensible?
11. What are the rules for using a floor chart? The blackboard?
12. What are the rules for presenting a film?

APPRAISAL FORM

BASIS OF RATING:

4—Superior
3—Excellent
2—Good
1—Fair
0—Unsatisfactory

Name of Instructor ____________________

Name of Observer ____________________

Lesson Title ____________________

Date __________ Time __________

	RATING		REMARKS
Classroom		LOCATION: in terms of available facilities	
		APPEARANCE: cleanliness, orderliness	
		LIGHTING, VENTILATION, SEATING	
Instructor		APPEARANCE: bearing, neatness	
		PHYSICAL VITALITY: energy, enthusiasm	
		ATTITUDE: toward students	
		VOICE AND SPEECH: clarity, forcefulness	
		BODILY CONTROL: movements, gestures, mannerisms	
Students		APPEARANCE: neatness, bearing	
		ATTITUDE: attention, interest	
The Lesson		PREPARATION: adequacy	
		PRESENTATION—INTRODUCTION: clarity, completeness	
		PRESENTATION—EXPLANATION: effectiveness	
		PRESENTATION—DEMONSTRATION: effectiveness	
		APPLICATION: proper use	
		EXAMINATION: validity, comprehensiveness	
		DISCUSSION AND SUMMARY: completeness of summary	
		TEACHING AIDS: preparation, use	
		STUDENT PARTICIPATION	
Summary		EFFECTIVENESS OF LESSON	
		MAJOR STRENGTHS	
		MAJOR WEAKNESSES	

13. Why are student demonstrations, discussion, and application necessary?
14. How should demonstrations be made?
15. How should questions be asked?
16. How should a field trip be organized and conducted?
17. What is the first question an instructor must ask himself before he prepares a quiz, test, or examination?
18. How should an oral quiz be handled?
19. What is a performance test? What is the purpose of a performance test?
20. How may written examinations be classified?
21. What characterizes *objective* questions?
22. How should objective questions be phrased?
23. What is included in a summary, or close?
24. How should oral questions be used?
25. Why is it important to know how to handle "characters"?
26. Why is a self-appraisal by the instructor an advantage?
27. What is included in a self-evaluation?
28. How may the results of a self-appraisal be evaluated?

PROBLEMS AND PROJECTS

(The following assignments are suggested for instructor use)

Select certain key students and arrange them in groups according to their willingness and ability to perform a teaching demonstration, following the procedure laid down in the text.

1. Have Group 1 choose a subject to teach and prepare an instructional plan and present it to the class. Have them prepare the room, the props, select the appropriate audio-visuals, choose the best, or most appropriate teaching method or methods. Insist upon their reasoning for each selection.
2. Have Group 2 *present* their chosen subject matter. Have the other class members check their introductory remarks, speech, appearance, mannerisms, businesslike attitude, ability to arouse group interest, their classroom personality. Have the group check the demonstrators for logical presentation and handling of audio-visuals.
3. Have Group 3 demonstrate how they would lead a discussion, secure student demonstrations, ask questions, conduct a field trip.
4. Have Group 4 students demonstrate how to conduct oral and written quizzes, tests, and examinations.
5. Have Group 5 demonstrate how to summarize and close a class session, including questions, take-home piece, preview of next session, and other details.
6. Have Group 6 demonstrate how to handle "characters."

The instructor should have each student make a self-evaluation. This self-evaluation might be contrasted with an instructor evaluation and, if feasible, evaluations of each individual made by other students in the class. The appraisal form in the text may be used to facilitate the evaluation.

APPENDIX 1

Printed Teaching Aids

The instructor should regard visual aids as adjuncts to good teaching. Such aids cannot displace good textbooks and instructional techniques that have been used for generations. Visual aids are primarily intended for group study, and the content of even a series of motion pictures may not equal the content value of a good textbook. Furthermore, students can study a textbook at their own pace; they are not retarded or speeded by the fixed pace of the motion picture or sound film.

In addition to good textbooks, the need for special printed or duplicated teaching aids may arise. Because such aids are intended to relate to a specific situation or object, they are prepared by the instructor for spot use. These may be duplicated bulletins, single sheets of information or directions, cartoons, or illustrative material for bulletin boards. They should be prepared with the following considerations in mind:

1. They should be concise, simple and clear.
2. They should be prepared to appeal to the readers; to encourage them to read and study the materials. Printed materials should not be dry statements of facts.
3. They should be of a size convenient for use.
4. They should be illustrated as fully as the need requires.

When a large number of printed teaching aids are required, the services of a commercial printer should be secured. However, effective

duplicates of printed teaching aids for use in training or interorganization communications may be adequately prepared by the use of the Ditto, Mimeograph, Portagraph, Dexigraph, Lettergraph, Hektograph, Rex-o-graph, or numerous other duplicating machines.

Suggestions for preparing printed teaching aids. Most of us are amateurs when it comes to displaying artistic talents—but anyone who can write can effectively prepare duplicated bulletins.

In addition to good textbooks, there is frequent need for special printed or duplicated teaching aids. These aids, commonly known as "pass-out sheets," relate to a specific situation or object and are prepared for spot use.

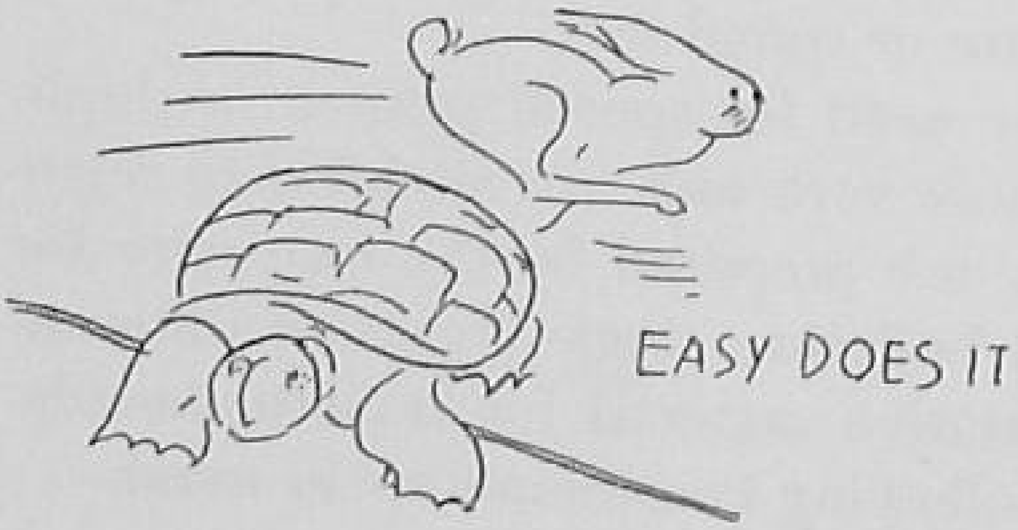
The actual preparation depends on the method used and the type of equipment available. Once you master a few major points, making duplicated training aids is easy, especially for color work, and teaching is more dynamic. After you have decided the method you would like to use, or the method available for use, simple, easy-to-follow instructions are provided.

Supplementary sheets should be prepared with the following in mind:

1. They should be concise, simple, and clear.
2. They should be prepared to appeal to the readers; to encourage them to read and study the materials. Headlines make people want to read the message. Eye-catcher captions in different lettering will say

'Read This.'

3. They should be of a size convenient for use.



4. They should be illustrated as fully as the need requires. Pictures often illustrate a point more vividly than words.[1]

The stencil and direct-process methods are two of the more commonly used methods. Both are easy to prepare and equally effective.

Preparing stencils. The tough, porous tissue with an ink-impervious coating used for some forms of duplication is called a stencil sheet. When you type or draw on the stencil, an impression is made, pushing the coating away, and it is through the resulting openings that the ink passes, coming in contact with the impression paper.

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[1] Mimeograph Lettering Guide #684L was used to make a tracing of the illustration that appears on this page. (It was traced from page 31 of "Mimeo-Tracings," published by the A. B. Dick Company.)

Basic steps in stencil preparation.

I. Arrange the work to be done
   A. Selection of paper
      1. Use same size and position as wanted on the finished copy.
   B. Margins
      1. Plan carefully so they fall inside the limitation lines of the stencil.
         a. Copy outside the limitation lines will not be reproduced.

II. Plan position on stencil
   A. Placing
      1. Place guide sheet between stencil sheet and backing.
      2. Top edge of paper should come to the line designating the top line guide for impression paper.
      3. Holding this up to the light, be absolutely sure that the work falls within the limitation lines.

III. Cutting the stencil
   A. The typewriter
      1. Shift ribbon out of printing position.
      2. Brush type thoroughly so as to remove dirt.
         a. Keep keys clean at all times.
   B. The stencil
      1. Insert cushion sheet between stencil sheet and backing.
         a. Shiny side should be next to the stencil sheet.
      2. Smooth out all three sheets
   C. Inserting stencil into typewriter
      1. Insert all three sheets with the backing next to the platen.
      2. Align stencil so numerical markings on both sides of the stencil correspond.
   D. Typing
      1. Type slowly.
      2. Use a uniform staccato touch.
      3. Check from time to time to be sure stencil is not wrinkling.

IV. Writing, drawing, ruling
   A. These are easily reproduced on a stencil sheet either by freehand or tracings.
   B. Most effectively done when an illuminated drawing board is used; however, any smooth, flat, hard surface will do.
      1. If an illuminated drawing board is not used, a flexible writing plate must be inserted between the stencil sheet and backing.

V. Correcting mistakes
   A. Correction fluid
      1. Apply a coating of correction fluid over the mistake, allow to dry, then retype or draw over spot to be corrected.

Direct-process method

Basic steps in preparation.

I. Materials needed
   A. Master paper, special aniline dye carbon paper, backing sheet
II. Planning work
   A. Arrange work to be done on separate sheet of paper to guide you in setting up your final copy.
III. Typing direct-process masters
   A. Clean typewriter keys thoroughly.
   B. Place a sheet of the special carbon paper, carbon side up, on backi~g sheet, then place the master sheet on top of the carbon.
   C. Insert in typewriter, master sheet up.
   D. Type as though typing a regular carbon copy.
      a. Use a firm, even stroke.
IV. Drawing on direct-process masters
   A. Sketch drawing *lightly* on master sheet.
   B. Insert backing sheet and carbon in place, then go over drawing.
   C. Work on a hard, smooth, flat surface.
V. Correcting an error
   A. Use a piece of scratch paper to isolate error and prevent smearing.
   B. Erase carefully with an ordinary pencil eraser. Keep erasing until all smudges have disappeared.

The portable pulpit. A lightweight holder is equipped with clamps for holding the printed film text from which the instructor talks. A hooded lamp illuminates the printed text, so that the instructor can read it in the darkened room, and also illuminates the speaker's face. This feature also adds a dramatic touch which aids the instructor in holding student interest and attention.

The General Electric Company has developed an excellent visual presentation technique using both filmstrips and printed film texts. As the filmstrip is projected on a screen in a darkened room, the speaker

reads the accompanying text from corresponding copy material which is securely held in a portable pulpit. Dramatic pictures are used but the oral presentation is made by a speaker, using the printed film text. The voice and personality of a flesh-and-blood speaker adds much to the presentation. With this method the speaker can stop at any time to develop an important point, to point out features which appear on the screen, or to answer questions which may arise.

This technique is comparatively inexpensive because it is not necessary to produce a transcription record or use a sound slidefilm projector. An inexpensive filmstrip projector and a portable pulpit are all that are needed. Slides may be used instead of filmstrips, and ordinary text material which has been prepared for each slide may be substituted for the printed film text. In fact, many variations of this technique may be developed to meet the specific situation.

Homemade portable pulpits may be constructed by attaching a pocket type or ordinary flashlight to a piece of composition board or a paper clip board. Some ingenious teachers have attached a small hooded night light with an electric extension cord to a clamp board with excellent results.

Printed film text. Good printed film texts may be used for many purposes other than assisting the instructor in the presentation. They may be distributed to each student before or after presenting the film and be used as a guide for discussion. A copy may also be filed or placed near the desk, table, or counter for quick reference.

Sources of Equipment for Printed Teaching Aids

Ditto: Ditto, Inc., 641 S. Oakley Blvd., Chicago, Ill.
Mimeograph: A. B. Dick Company, 720 W. Jackson Blvd., Chicago, Ill.
Portagraph—Dexigraph: Remington Rand, Inc., 315 Fourth Avenue, New York, N. Y.
Lettergraph—Hektograph: The Heyer Corporation, 901 W. Jackson Blvd., Chicago, Ill.
Rex-o-graph: Rex-o-graph, Inc., 3721 N. Palmer Street, Milwaukee, Wis.
Portable pulpit: Ora Visual Company, Fairfield, Conn. (An aluminum model for holding scripts up to 8½″ × 11½″ with a special switch spring holder and a 10′ extension cord.)

Complete information concerning style, size, price, and operation of the listed duplicators may be obtained by contacting the nearest distributor or by writing directly to the central office.

QUESTIONS

1. What are the values of printed training aids?
2. What general rules should govern the preparation or purchase of special printed or duplicated materials?
3. What are the names of several of the more important duplicating machines?

PROBLEMS AND PROJECTS

1. Select one textbook, one comprehensive training manual, or one comprehensive educational monograph or mimeographed bulletin. Evaluate one of the four selected publications on the following points:

a. Value as a basic publication.

b. Value as a supplementary publication.

c. Educational level of class or group that would find the publication of most use.

d. Outstanding features from the sales, teaching, and learning viewpoints.

e. Helpful features such as problems, questions, illustrations, footnotes, bibliographies, appendices, summaries, problems, teachers' guide, student problems, and projects.

f. In relation to other, competing publications.

g. How your selected publications differ from other publications. (What do your publications have that others do not have?)

h. What groups could use your publications? (For example: students, other educational groups, societies and associations, libraries, general public, professions, business organizations, governmental departments or employees, armed services, others.)

i. Give your suggestions for improvement of the publication you are evaluating.

j. Briefly suggest how you would use your chosen publication in your work or educational situation.

APPENDIX 2

Sources of Audio-Visual Aids

Audio-visual aids are being distributed by manufacturers, producers, processors, distributors, service groups, local schools, colleges and universities, federal government departments and agencies, state government departments and agencies, libraries, churches, museums, associations, and commercial dealers throughout the country.

These aids may be purchased, rented, or borrowed. In a large number of cases they are made available free of charge with the user paying the cost of transportation. In some cases, distribution is limited to local or state areas. However, the majority of these aids are available on a national basis.

Colleges, Universities, and State Agencies Which Maintain Audio-Visual Aid Libraries

ALABAMA

Alabama Polytechnic Institute, Agricultural Extension Service, Auburn.
Alabama State Department of Public Health, Division of Public Health Education, Montgomery.
University of Alabama Extension Division, Audio-Visual Aids, P.O. Box 1991, University.

ALASKA

University of Alaska, College.
Alaska Department of Health, P.O. Box 1931, Juneau.

ARIZONA

Arizona State College, Flagstaff.
Arizona State Department of Health, Phoenix.
Arizona State College, Audio-Visual Aids, Tempe.
University of Arizona, Visual Aids Bureau, Tucson.

ARKANSAS

Arkansas State Teachers College, Conway.
Arkansas State Board of Health, Division of Public Health Education, Little Rock.
Arkansas State Department of Education, Audio-Visual Service, Little Rock.
Harding College, Motion Picture Division, Searcy.

CALIFORNIA

Humboldt State College, Audio-Visual Department, Arcata.
University of California Extension, Department of Visual Education, Berkeley.
Fresno State College, Audio-Visual Department, Fresno.
Long Beach City College, Long Beach.
East Los Angeles Junior College Library, 5357 E. Brooklyn Avenue, Los Angeles.
Los Angeles City College, Los Angeles.
Los Angeles Harbor Department, Public Relations Division, City Hall, Los Angeles.
Loyola University of Los Angeles, 7101 W. 80th Street, Los Angeles.
Occidental College, Audio-Visual Department, Los Angeles.
University of California, University Extension, Visual Instructions, Los Angeles.
University of Southern California, Audio-Visual Service Department, 3518 University Avenue, Los Angeles.
California College of Arts and Crafts, Oakland.
California Institute of Technology, Pasadena.
California State Department of Education, Bureau of Audio-Visual Education, Library and Courts Building, Sacramento.
Sacramento State College, Audio-Visual Education, Sacramento.
San Diego State College, Audio-Visual Department, San Diego.
California State Automobile Association, 150 Van Ness Avenue, San Francisco.
California State Department of Public Health, Bureau of Health Education, 760 Market Street, San Francisco.
San Francisco City College, Audio-Visual Department, Ocean and Phelan Avenues, San Francisco.
San Francisco State College, Audio-Visual Library, San Francisco.
San Jose State College, Audio-Visual Service Center, San Jose.
California State Polytechnic College, Audio-Visual Education, San Luis Obispo.
San Mateo Junior College, San Mateo.
University of Santa Clara, Father Hubbard Educational Films, Santa Clara.
College of the Pacific, Stockton.
Los Angeles Harbor Junior College, 1111 Figueroa Street, Wilmington.

COLORADO

University of Colorado, Bureau of Audio-Visual Instruction, Boulder.
Colorado State Department of Public Health, Health Education Section, State Office Building, Denver.
State of Colorado, Department of Advertising and Publicity, Capitol Building, Denver.
University of Denver, Audio-Visual Service, Denver.
Colorado A. and M. College, Visual Aid Service, Fort Collins.
Colorado State College of Education, Instructional Materials Center, Greeley.
Pueblo Junior College, Center of Audio-Visual Materials, 900 W. Orman Avenue, Pueblo.

CONNECTICUT

University of Bridgeport Audio-Visual Aids Center, Bridgeport.
Connecticut State Department of Health, Bureau of Public Health Information, 165 Capitol Avenue, Hartford.
Connecticut Tuberculosis Assn., Inc., Sanborn Building, 43 Farmington Avenue, Hartford.
Teachers College of Connecticut, New Britain.
Yale University Press Film Service Inc., 143 Elm Street, New Haven.
University of Connecticut, Audio-Visual Aids Center, Storrs.

DELAWARE

Delaware State Board of Health, Public Health Information, Dover.
State Department of Education, Film Library, Dover.

DISTRICT OF COLUMBIA

Armed Forces Institute of Pathology, Medical Illustration Service.

FLORIDA

University of Florida, General Extension Division, Department of Visual Instruction, Gainesville.
Florida State Board of Health, Division of Health Information, P.O. Box 210, Jacksonville.
Jacksonville Board of Public Instruction, 605 Ocean Street.
Florida State University, Audio-Visual Service, Tallahassee.

GEORGIA

University of Georgia, Division of General Extension, Old College, Athens.
Georgia Department of Public Health, Division of Public Health Education, 332 State Office Building, Atlanta.
Georgia Institute of Technology Library, Atlanta.
Georgia State Department of Education, Audio-Visual Education Service, 121 Memorial Drive, S.W., Atlanta.
Georgia Tuberculosis Association, 607-11 Chamber of Commerce Building, Atlanta.
Georgia State Department of Education, Collegeboro Film Library, Georgia Teachers' College, Library Building, Collegeboro.
Emory University, Teaching Aids Office, Emory University.
Georgia State Department of Education, 10620 Forsyth Street, Macon.
Georgia State Department of Education, Tifton Film Library, Abraham Baldwin College, Tifton.

HAWAII

Department of Health, Territory of Hawaii, Office of Health Education, Honolulu.
University of Hawaii, Agricultural Extension Service, Honolulu.
University of Hawaii, University High School Film Library, Honolulu.

IDAHO

Boise Junior College, Education Film Library, Boise.
Idaho Department of Public Health, Boise.
Idaho Tuberculosis Association, Inc., 807 North Seventh Street, P.O. Box 1868, Boise.
University of Idaho, Agricultural Extension Division Film Library, Boise.
University of Idaho, Audio-Visual Center, Moscow.
Idaho State College, Educational Film Library, Pocatello.

ILLINOIS

Southern Illinois University, Audio-Visual Aids Service, Carbondale.
University of Illinois, Visual Aids Service, Champaign.

Eastern Illinois State College, Audio-Visual Center, Charleston.
Chicago Teachers College, Chicago.
College Film Center, 57 E. Jackson Boulevard, Chicago.
Illinois Institute of Technology, Department of Visual Education, 3300 Federal Street, Chicago.
Loyola Educational Film Library, Loyola University, 6525 Sheridan Road, Chicago.
Northwestern University Medical School, Audio-Visual Medical Education Department, 303 E. Chicago Avenue, Chicago.
University of Chicago, Center for the Study of Audio-Visual Education, Chicago.
Northern Illinois State Teachers College, Audio-Visual Education, De Kalb.
Western Illinois State College, Audio-Visual Education, Macomb.
Illinois State Normal University, Audio-Visual Education, Normal.
Bradley University, Audio-Visual Center, Peoria.
Guadalupe Films, Quincy College, Quincy.
Illinois Department of Public Health, Bureau of Health Education, Springfield.
Illinois Division of Department Reports, Film Library, 406 Capitol Building.
Wheaton College, Audio-Visual Instruction, Wheaton.

INDIANA

Indiana University, Audio-Visual Center, Bloomington.
Evansville College, Evansville.
Goshen College, Goshen.
Butler University, Indianapolis.
Indiana State Board of Health, Division of Health and Physical Education, 1330 W. Michigan Street, Indianapolis.
Purdue University, Film Library, Lafayette.
Ball State Teachers College Library, Muncie.
University of Notre Dame, Notre Dame.
Indiana State Teachers College, Extension Film Service, Terre Haute.

IOWA

Iowa State College, Visual Instruction Service, Ames.
Iowa State Department of Health, Division of Public Health Education, Des Moines.
State University of Iowa, Extension Division, Bureau of Audio-Visual Instruction, Iowa City.
Iowa Wesleyan College, Audio-Visual Education Center, Mt. Pleasant.

KANSAS

Kansas State Teachers College, Emporia.
Fort Hays Kansas State College, Hays.
University of Kansas, University Extension, Bureau of Visual Instruction, Lawrence.
Kansas State Board of Health, Topeka.

KENTUCKY

Villa Madonna College, 116 E. Twelfth Street, Covington.
Kentucky State Department of Health, Division of Public Health Education, 620 S. Third Street, Louisville.
University of Louisville, Louisville.
University of Louisville, School of Medicine, 323 E. Chestnut Street, Louisville.
Eastern Kentucky State College, Richmond.

LOUISIANA

Louisiana State Department of Public Welfare, State Capitol Annex, P.O. Box 4065, Baton Rouge.
Louisiana State University, Agricultural Extension Service, Baton Rouge.

Southern University, Film Library, Southern Branch P.O., Baton Rouge.
State of Louisiana, Department of Institutions, Mental Hygiene Division, State Capitol Building, Baton Rouge.
Southeastern Louisiana College, Film Library, Hammond.
Southwestern Louisiana Institute, Film Library, Lafayette.
Northwestern State College, Film Library, Natchitoches.
Louisiana State Department of Health, Division of Public Health Education, Dryades Street (1436), New Orleans.
Louisiana Polytechnic Institute, Film Library Division, Ruston.

MAINE

State of Maine, Department of Health and Welfare, Augusta.
University of Maine, Audio-Visual Service, South Stevens Hall, Orono.
State of Maine Publicity Bureau, 3 St. John Street, Portland.

MARYLAND

Maryland State Department of Education, Division of Library Extension, 400 Cathedral Street, Baltimore.
University of Maryland, Extension Service, Film Library, College Park.

MASSACHUSETTS

University of Massachusetts, Audio-Visual Center, Amherst.
Boston University Film Library, School of Education, 332 Bay State Road, Boston.
Massachusetts Department of Public Health, Section of Health Information, State House, Boston.
State of Massachusetts, Division of Vocational Rehabilitation, 200 Newbury Street, Boston.

MICHIGAN

University of Michigan, Audio-Visual Education Center, Ann Arbor.
Wayne University, Visual Auditory Center, 4841 Cass Avenue, Detroit.
Michigan State College, Audio-Visual Center, East Lansing.
Western Michigan College of Education, Audio-Visual Center, Lansing.
Michigan Department of Health, Section of Education, Lansing.
Central Michigan College, Bureau of Audio-Visual Aids, Mount Pleasant.
Michigan State Normal College, Audio-Visual Aids Center, Ypsilanti.

MINNESOTA

University of Minnesota, Extension Film Library, 111 Administration Building, Duluth.
Minnesota Department of Health, Section of Public Health Education, University Campus, Minneapolis.
University of Minnesota, Audio-Visual Extension Service, 230 Northrop Memorial Auditorium, Minneapolis.
State Teachers College, St. Cloud.
Macalester College, St. Paul.
Minnesota Department of Highways, 1246 University Avenue, St. Paul.
University of Minnesota, Agricultural Extension Film Library, St. Paul Campus, St. Paul.

MISSISSIPPI

Mississippi Southern College, Audio-Visual Education, Hattiesburg.
Mississippi State Board of Health, Division of Health Education, Jackson.
Mississippi State Department of Education, Division of Instruction, Audio-Visual Education, Jackson.
University of Mississippi, School of Education Department of Audio-Visual Education, University.

MISSOURI

Southeast Missouri State College, Audio-Visual Center, Cape Girardeau.
University of Missouri, Adult Education and Extension Service, Visual Education Department, Columbia.
State of Missouri, Vocational Rehabilitation, Room 1, Hotel Governor, Jefferson City.
Northeast Missouri State Teachers College, Kirksville.
University of Missouri, School of Mines and Metallurgy, Engineering Drawing Department, Rolla.
St. Louis University, Film Library, 15 N. Grand Boulevard, St. Louis.
Central Missouri College, Audio-Visual Teaching Materials Library, Warrensburg.

MONTANA

Montana State College, Extension Service, Publication Department, Bozeman.
Montana State Department of Public Instruction, Montana State Film Library, Helena.

NEBRASKA

Nebraska State Teachers College, Division of Visual Education, Kearney.
Nebraska State Department of Health, Division of Public Health Education, Lincoln.
University of Nebraska, University of Extension Division, Bureau of Audio-Visual Aids, Lincoln.
University of Omaha, Bureau of Teaching Aids, Omaha.
Nebraska State Teachers College, Peru.
Nebraska State Teachers College, Teaching Materials Center, Wayne.

NEVADA

University of Nevada, Agricultural Extension Division, Reno.

NEW HAMPSHIRE

New Hampshire State Department of Health, Bureau of Health Education, Concord.
University of New Hampshire, Audio-Visual Center, Durham.
Dartmouth College Films, Baker Library, Hanover.

NEW JERSEY

New Jersey Department of Education, State Museum, State House Annex, Trenton.
New Jersey State Teachers College, Trenton.
State Teachers College, Audio-Visual Aids Service, Upper Montclair.

NEW MEXICO

University of New Mexico, Extension Division, Albuquerque.
Eastern New Mexico University, Film Library, Portales.
New Mexico State Department of Health, Film Library, Santa Fe.
New Mexico A. and M. College, State College.

NEW YORK

New York State Conservation Department, Division of Conservation Education, Broadway Arcade Building, Albany.
New York State Department of Commerce, Film Library, 40 Howard Street, Albany.
New York State Department of Health, Office of Public Health Education, 18 Dove Street, Albany.
State College Film Service, 135 Western Avenue, Albany.
New York State College for Teachers, 1300 Elmwood, Buffalo.
University of Buffalo, Buffalo.
State Teachers College, Cooperative Film Library, Fredonia.

Cornell University, New York State College of Agriculture, Film Service, Ithaca.
Cornell University, New York State School of Industrial and Labor Relations, Ithaca.
The City College School of Business, Audio-Visual Extension Service, 17 Lexington Avenue, New York.
Columbia University Press, Columbia University Educational Films, 413 W. 117th Street, New York.
New York University, Film Library, 26 Washington Place, New York.
Yale University Press Film Service, Inc., 386 Fourth Avenue, New York.
State University Teachers College, Oneonta Film Exchange, Oneonta.
State Teachers College, Adirondack Film Library, Plattsburg.
State University Teachers College, Off-Campus Teaching, Potsdam.
Syracuse University, Educational Film Library, Syracuse.

NORTH CAROLINA

University of North Carolina, Bureau of Visual Education, Chapel Hill.
Western Carolina Teachers College, Cullowhee.
North Carolina State Board of Health, Division of Local Health Administration, The Film Clerk, Raleigh.
North Carolina Department of Conservation and Development, State Travel Bureau, Raleigh.
State of North Carolina, Division of Vocational Rehabilitation, Department of Public Instruction, Raleigh.

NORTH DAKOTA

State Health Department, Bismarck.
Agricultural College, Department of Information, Fargo.
State of North Dakota, Division of Vocational Rehabilitation, University Station, Grand Forks.

OHIO

University of Akron, Audio-Visual Aids Department, Akron.
Western Reserve University, Audio-Visual Aids, Akron.
Ohio Department of Public Welfare, Rehabilitation Services for the Blind, Oak and Ninth Streets, Columbus.
Ohio State Department of Education, Division of Audio-Visual Education, Columbus.
Ohio State University, Agricultural Extension Service, Columbus.
Ohio State University, Teaching Aids Laboratory, Columbus.
Kent State University, Audio-Visual Center, Kent.
Wittenberg College Library, Audio-Visual Aids Department, Springfield.

OKLAHOMA

Northwestern State College, Audio-Visual Education, Alva.
Southeastern State College, Film Division, Durant.
Central State College, Audio-Visual Education, Edmond.
Panhandle A. and M. College, Goodwell.
University of Oklahoma, Extension Division, Educational Materials Services, Audio-Visual Education, Norman.
Oklahoma State Department of Health, 3400 N. Eastern, Oklahoma City.
Oklahoma State Game and Fish Commission, State Capitol Building, Oklahoma City.
Oklahoma A. and M. College, Extension Service, Stillwater.
Northeastern State College, Audio-Visual Education, Tahlequah.
Southwestern State College, Audio-Visual Education, Weatherford.

OREGON

Southern Oregon College of Education, Audio-Visual Aids Center, Extension Division, Oregon State System of Higher Education, Ashland.

Oregon State System of Higher Education, Department of Visual Instruction, Corvallia.
Pacific University, Forest Grove.
Eastern Oregon College of Education, Instructional Materials Center, Library Building, La Grande.
Lewis and Clark College, Portland.
Oregon State Board of Health, Portland.
State of Oregon, Traffic Safety Division, Salem.

PENNSYLVANIA

Commonwealth of Pennsylvania, Department of Health, Division of Health Education, Harrisburg.
State Teachers College, Kutztown.
Bucknell University, Visual Aids Library, Lewisburg.
State Teachers College, Lock Haven.
State Teachers College, Millersville Cooperative Film Library, Millersville.
Wistar Institute, 36th and Woodland Avenue, Philadelphia.
Pennsylvania College for Women, PCW Film Service, Pittsburgh.
State Teachers College, Shippensburg.
Pennsylvania State College, Audio-Visual Aids Library, State College.
Pennsylvania State College, Psychological Cinema Register, State College.
Pennsylvania Regional Film Library, State Teachers College, West Chester.

PUERTO RICO

Department of Education, Bureau of School Extension, San Juan.
Department of Education, Division of Community Education, San Juan.
Department of Health, Bureau of Health Education, San Juan.
Public Parks and Recreation Administration, Administrative Division, San Juan.
University of Puerto Rico, Agricultural Extension, Rio Piedras.

RHODE ISLAND

University of Rhode Island, Library, Kingston.

SOUTH CAROLINA

Clemson Agricultural College, School of Education, Clemson.
South Carolina State Health Department, Wade Hampton Office Building, Columbia.
University of South Carolina, Audio-Visual Aids Bureau, Columbia.
Unusual Films, Bob Jones University, Greenville.

SOUTH DAKOTA

Northern State Teachers College, Northern Cooperative Film Library, Aberdeen.
South Dakota State College, Department of Audio-Visual Education, Brookings.
South Dakota State Board of Health, Division of Health Education, Pierre.
Sioux Falls College, Sioux Falls.
Black Hills Teachers College, Spearfish.
Southern State Teachers College, Cooperative Film Library, Springfield.

TENNESSEE

East Tennessee State College, Johnson City.
University of Tennessee, Division of University Extension, Knoxville.
University of Tennessee, Division of University Extension, West Tennessee Branch Film Library, Martin.
Tennessee Department of Education, Division of Instructional Materials and Library Service, Room 220, War Memorial Building, Nashville.
Tennessee Department of Public Health, 420 Sixth Avenue N., Nashville.
University of Tennessee, Division of University Extension, Middle Tennessee Branch Film Library, 2321 West End, Nashville.

TEXAS

Abilene Christian College, West Texas Film Library, Abilene.
Sul Ross State Teachers College, Alpine.
Arlington State College, Visual Aids Library, Arlington.
Texas Education Agency, Audio-Visual Library, Austin.
Texas State Department of Health, Public Health Education, Austin.
University of Texas, Division of Extension, Visual Instruction Bureau, Austin.
West Texas State College, Bureau of Public Service, Film Division, Canyon.
Texas A. and M. College System, Agricultural Extension Service, College Station.
East Texas State Teachers College, Audio-Visual Aids Library, Commerce.
Texas State College for Women, Visual Instruction Service, Denton.
University of Houston, Houston.
Sam Houston State Teachers College, Estill Library, Film Division, Huntsville.
Texas A. and I. College, Film Service, Kingsville.
West Texas Cooperative Audio-Visual Services, Texas Technological College, Lubbock.
Stephen F. Austin State College, Nacogdoches Film Library, Nacogdoches.

UTAH

Utah State Agricultural College, Audio-Visual Library, Logan.
Brigham Young University, Bureau of Audio-Visual Instruction, Provo.
University of Utah, Extension Division, Audio-Visual Bureau, Salt Lake City.

VERMONT

University of Vermont, Robert Hull Fleming Museum, Vermont Film Library.

VIRGINIA

Virginia Polytechnic Institute, Agricultural Extension Service, Film Library, Blacksburg.
Virginia State Department of Education, Regional Bureau of Teaching Materials, University of Virginia, Extension Division, Charlottesville.
Virginia State Department of Education, Regional Bureau of Teaching Materials, Longwood College, Farmville.
Virginia State Department of Education, Regional Bureau of Teaching Materials, Madison College, Harrisonburg.
Virginia State College, Audio-Visual Center, Petersburg.
Virginia State Department of Education, Regional Bureau of Teaching Materials, Radford College, Radford.
Virginia Department of Conservation and Development, Division of Publicity and Advertising, Richmond.
Virginia State Board of Education, Bureau of Teaching Materials, Richmond.
College of William and Mary, Audio-Visual Center, Williamsburg.

WASHINGTON

Walla Walla College, Film Service, College Place.
Central Washington College of Education, Office of Visual Education, Ellensburg.
State College of Washington, Audio-Visual Center, Pullman.
University of Washington, Instruction Materials Center, Seattle.
Washington State Department of Health, Health Education Section, Seattle.
Gonzaga University, Spokane.

WEST VIRGINIA

Conservation Commission of West Virginia, State Capitol Building, Room 677, Charleston.
State of West Virginia, Division of Vocational Rehabilitation, Capital City Building, Charleston.

West Virginia State Department of Health, Bureau of Public Health Education, Charleston.
Marshall College, Audio-Visual Aids Laboratory, Huntington.
West Virginia University Library, Audio-Visual Aids Department, Morgantown.
Oglebay Institute, Film Library, Pythian Building, Wheeling.

WISCONSIN

University of Wisconsin, Extension Division, Bureau of Visual Instruction, Madison.
Wisconsin State Board of Health, Health Education Division, State Office Building, Madison.
Wisconsin State Conservation Commission, State Capitol Building, Madison.
The Stout Institute, Menomonie.

WYOMING

University of Wyoming, Wyoming Film Library, Laramie.

The colleges and universities and federal and state departments and agencies listed are rapidly developing large libraries of audio-visual aids covering a multitude of educational and specific subject fields. Owing to the variable nature of this material, an attempt was not made to list all subject titles or their methods of distribution. However, up-to-date information will be supplied by these sources upon request. Contact your nearest source to save time and transportation charges.

Public Libraries Which Provide Audio-Visual Aid Services

ARKANSAS

Jefferson County Film Library, Jefferson County Courthouse, Pine Bluff.
Pope County Film Library, Pope County Courthouse, Russellville.
White County Film Library, White County Courthouse, Searcy.
Crawford County Film Library, Crawford County Courthouse, Van Buren.

CALIFORNIA

Alhambra Public Library, 410 W. Main Street, Alhambra.
Coalinga District Library, Coalinga.
Fullerton Public Library, Willshire and Pomona Avenue, Fullerton.
Glendale Public Library, 319 E. Harvard Street, Glendale.
Long Beach Public Library, Film Service, Long Beach.
Los Angeles Public Library, Audio-Visual Service, Los Angeles.
Monterey Public Library, Monterey.
Orange Public Library, 407 E. Chapman, Orange.
Pasadena Public Library, 285 E. Walnut Street, Pasadena.
Pomona Public Library, 380 N. Main Street, Pomona.
Richmond Public Library, Film Service, Richmond.
Riverside Public Library, 3581 Seventh Street, Riverside.
San Bernardino County Free Library, 364 Mt. View Avenue, San Bernardino.
San Bernardino Public Library, Fourth and D Streets, San Bernardino.
San Jose Public Library, San Jose.
Santa Monica Public Library, Film Service, Santa Monica.
South Pasadena Public Library, 1025 El Centro, South Pasadena.
Stockton Free Public Library, Stockton.
Whittier Public Library, 206 N. Greenleaf Avenue, Whittier.

COLORADO

Larimer County Library, Film Service, Fort Collins.

CONNECTICUT

The Greenwich Library, Greenwich.
Hartford Public Library, Hartford.
Russell Library, Film Department, Middletown.

DISTRICT OF COLUMBIA

District of Columbia Public Library, Film Reference and Lending Service, Washington.

FLORIDA

Miami Public Library, 1 Biscayne Boulevard, Miami.

GEORGIA

Augusta Regional Library, Augusta.
West Georgia Regional Library, Box 62, Carrollton.
Northeast Georgia Regional Library, Clarkesville.
Dalton Regional Library, Dalton.
Flint River Regional Library, 210 S. Sixth Street, Griffin.
Middle Georgia Regional Library, Washington Memorial Library, Macon.

HAWAII

Library of Hawaii, Honolulu.

ILLINOIS

Coles County Film Library, Charleston.
The Chicago Public Library, Visual Materials Center, Michigan Boulevard and Washington St., Chicago.
Evanston Public Library, Evanston.
Kane County Film Library, Geneva.
McDonough County Film Library, Macomb.
La Salle County Film Library, Ottawa.
Peoria Public Library, Peoria.
Douglas County Film Library, Tuscola.
Iroquois County Film Library, Watseka.

INDIANA

Gary Public Library, Fifth Avenue at Adams St., Gary.
Indianapolis Public Library, Indianapolis.
Tyson Public Library, Versailles.
Kosciusko County Film Library, Court House, Warsaw.

KANSAS

Topeka Public Library, Topeka.
Wichita Public Library, Wichita.

KENTUCKY

Louisville Public Library, Louisville.

LOUISIANA

Louisiana State Library, Film Service, Baton Rouge.

MAINE

Portland Public Library, Portland.

MASSACHUSETTS

Boston Public Library, Film Service, Boston.
Fitchburg Public Library, Film Service, Fitchburg.

MICHIGAN

Dearborn Public Library, Dearborn.
Detroit Public Audio-Visual Department, 5201 Woodward Avenue, Detroit.
Flint Public Library Film Service, Kearsley and Clifford Sts., Flint.
Grand Rapids Public Library, Ryerson Library Building, Grand Rapids.
Hamtramck Public Library, 10338 Joseph Campau, Hamtramck.
McGregor Public Library, 12244 Woodward Avenue, Highland Park.
Kalamazoo Public Library, Kalamazoo.
Michigan State Library, Lansing.
South Oakland Film Library, 1026 N. Main Street, Royal Oak.

MINNESOTA

Minneapolis Public Library, Hennepin at Tenth, Minneapolis.
St. Paul Public Library, St. Paul.

MISSOURI

Henry County Library, Film Service, Clinton.
Cass County Library, Film Service, Harrisonville.
Texas County Library, Houston.
Cole County Library, Film Service, Jefferson City.
Missouri State Library, Jefferson City.
Dunklin County Library, Film Service, Kenneth.
North Kansas City Public Library, Film Service, North Kansas City.
Ray County Library, Film Service, Richmond.
Atchison County Library, Film Library, Rockport.
Greene County Library, Film Service, Springfield.

NEW JERSEY

Bloomfield Public Library, Film Service, Bloomfield.

NEW YORK

Buffalo Film Library, Inc., 1009 E. Lovejoy Street, Buffalo.
New York State Library, Regional Library Service Center, 446 Cross Street, Watertown.

NORTH CAROLINA

Pack Memorial Public Library, Asheville.
Concord Public Library, Concord.
Gaston County Public Library, Gastonia.
Warren Public Library, Durham.
Caldwell County Public Library, Lenoir.
Natahala Regional Library, Murphy.
Haywood County Public Library, Waynesville.
Raney Library, Raleigh.

OHIO

Akron Public Library, Group Service Department, Akron.
Carnegie Free Library, Alliance.
Public Library, Bexley.
Guernsey County District Public Library, Cambridge.
Manse Film Library, 2514 Clifton Avenue, Cincinnati.
Cleveland Public Library, 325 Superior Avenue, Cleveland.
Dover Public Library, Dover.
Birchard Library, Freemont.
Lane Public Library, Hamilton.
Carnegie Public Library, Steubenville.

PENNSYLVANIA

Grise Film Library, 105 E. Ninth Street, Erie.
Lycoming County Library, Audio-Visual Materials, 500 Clayton Avenue, Williamsport.

TENNESSEE

Kingsport Public Library Film Service, Kingsport.

WISCONSIN

Manitowoc Public Library, 402 N. Eighth Street, Manitowoc.
Rhinelander Public Library, Rhinelander.
Wausau Public Library, Wausau.

Business and Industrial Organizations Which Maintain Audio-Visual Aid Libraries

ALABAMA

United States Steel Company, Tennessee Coal and Iron Division, Birmingham Film Distributive Center, Brown-Marx Building, Fairfield.

CALIFORNIA

Canadian National Railways, Motion Picture Library, 607 South Grand Avenue, Los Angeles.
Canadian Pacific Railway, 513 West Sixth Street, Los Angeles.
General Electric Company, Advertising and Sales Promotion Division, Distributive Section, 212 N. Vignes Street, Los Angeles.
Goodyear Tire & Rubber Company, Inc., Motion Picture Department, Los Angeles.
Lederle Laboratories, Division of American Cyanamid Company, Film Library, 2300 S. Eastern Avenue.
Singer Sewing Machine Company, Manufacturing Agency, 808 S. Broadway.

COLORADO

Colorado Fuel & Iron Corp., Denver.
General Electric Company, Advertising and Sales Promotion Division, Distributive Section, 650 Seventeenth Street, Denver.
Singer Sewing Machine Company, Manufacturers' Agency, 1637 California Street, Denver.

CONNECTICUT

Singer Sewing Machine Company, Manufacturing Trade Department, 99 Elm Street, Bridgeport.
Bethlehem Steel Company, District Office, The Trust Company Building, New Haven.

DELAWARE

E. I. duPont de Nemours & Company, Advertising Department, Motion Picture Distributive, Wilmington.
Hercules Powder Company, Wilmington.

DISTRICT OF COLUMBIA

Bethlehem Steel Company, District Office, American Security Building, Washington.
Canadian National Railways, Motion Picture Library, 922 Fifteenth Street NW, Washington.
Canadian Pacific Railway, 1504 K Street NW, Washington.

Chesapeake & Potomac Telephone Company, 725 Thirteenth Street NW, Washington.
Congress of Industrial Organizations, Department of Education and Research, Film Division, 718 Jackson Place NW, Washington.

FLORIDA

Bethlehem Steel Company, District Office, 101 Cantee Street, Jacksonville.

GEORGIA

Bethlehem Steel Company, District Office, Candler Building, Atlanta.
Canadian Pacific Railway, 807-809 C and S, National Bank Building, Atlanta.
General Electric Company, Advertising and Sales, Promotion Division, Distribution Section, Peachtree Road at 28th Street NW, Atlanta.
Singer Sewing Machine Company, Manufacturers Agency, 172-A Trinity Avenue SW, Atlanta.

ILLINOIS

Atchison, Topeka & Santa Fe Railway, 80 E. Jackson Boulevard, Chicago.
Automatic Transportation Company, 101 West 87th Street, Chicago.
Bethlehem Steel Company, District Office, Wrigley Building, Chicago.
Canadian National Railways, Motion Picture Library, 103 West Adams Street, Chicago.
Canadian Pacific Railway, 39 La Salle Street, Chicago.
General Electric Company, Advertising and Sales, Promotion Division, Distributive Section, 840 S. Canan Street, Chicago.
Shell Oil Company, 624 S. Michigan Avenue, Chicago.
Singer Sewing Machine Company, Manufacturers Agency, 1019 W. Jackson Boulevard Chicago.
Standard Oil Co. Suite 1000, 20 N. Wacker Street, Chicago.

INDIANA

Standard Oil Company, 820 Division Street, Evansville.
Bethlehem Steel Company, District Office, Circle Tower Building, Indianapolis.
South Bend Lathe Works, 425 E. Madison Street, South Bend.

KENTUCKY

Reynolds Metals Company, Advertising Department, 2500 S. Third Street, Louisville.

LOUISIANA

Bethlehem Steel Company, District Office, 1617-27 Felicity Street, New Orleans.
Oil Industry Information Committee, Whitney National Bank Building, New Orleans.

MARYLAND

Bethlehem Steel Company, District Office, Mercantile Trust Building, Baltimore.
Esso Standard Oil Company, Motion Picture Department, St. Paul Place and Franklin Street, Baltimore.

MASSACHUSETTS

American Airlines, 50 Federal Street, Boston.
American President Lines, 89 State Street, Boston.
Bethlehem Steel Company, District Office, 75 Federal Street, Boston.
Canadian National Railways, Motion Picture Library, 497 Boylston Street, Boston.
Canadian Pacific Railway, 80 Boylston Street, Boston.
Esso Standard Oil Company, Motion Picture Department, 135 Clarendon Street, Boston.

General Electric Company, Advertising and Sales, Promotion Division, Distribution Section, 140 Federal Street, Boston.
Oil Industry Information Committee, 419 Boylston Street, Boston.
Pan American World Airways, 100 Federal Street, Boston.
United Air Lines, Park Square Building, Boston.

MICHIGAN

Ford Motor Company, Film Library, 16400 Michigan Avenue, Dearborn.
Bethlehem Steel Company, District Office, General Motors Building, Detroit.
Canadian National Railways, Motion Picture Library, 1239 Washington Boulevard, Detroit.
Canadian Pacific Railway, 1249 Washington Boulevard, Detroit.
General Electric Company, Advertising and Sales, Promotion Division, 700 Antoinette Street, Detroit.
General Motors Corporation, Department of Public Relations, 3044 W. Grand Boulevard, Detroit.
Pan American World Airways, 1231 Washington Boulevard, Detroit.
United Airlines, 1243 Washington Boulevard, Detroit.
Armstrong Machine Works, Three Rivers.

MINNESOTA

Canadian National Railways, Motion Picture Library, 1040 Rand Tower, Minneapolis.
Canadian Pacific Railway, 708 Second Avenue S, Minneapolis.
General Mills, Inc., Film Department, 400 Second Avenue S, Minneapolis.
Hardware Mutual Insurance Company, Nicollet at 24th Street, Minneapolis.
Oil Industry Information Committee, 1100 Rand Tower, Minneapolis.
Owens-Corning Fiberglas Corp., 1700 Rand Tower, Minneapolis.
Pan American Airways, 245 Rand Tower, Minneapolis.
Bethlehem Steel Company, District Office, First National Bank Building, St. Paul.
Northern Mall Iron, 867 Forest Street, St. Paul.

MISSISSIPPI

Oil Industry Information Committee, 405 Medical Building, Jackson.

MISSOURI

Associated Cooperage Industries of America, Inc., 408 Olive Street, St. Louis.
Bethlehem Steel Company, District Office, Shell Building, St. Louis.

NEBRASKA

Northwestern Bell Telephone Company, 118 S. Nineteenth Street, Omaha.
United Air Lines, 1706 Douglas Street, Omaha.

NEW YORK

Bethlehem Steel Company, District Office, National Savings Bank Building, Albany.
Canadian Pacific Railway, 422 Main Street, Buffalo.
Canadian National Railways, Motion Picture Library, 13 W. Genessee.
American Institute of Steel Construction, Inc., 101 Park Avenue, New York.
Asbestos-Cement Products Assn., 509 Madison Avenue, New York.
Bates Manufacturing Company, 30 Vesey Street, New York.
British and Irish Railways, Inc., 9 Rockefeller Plaza, New York.
Ford Motor Company, Film Library, 15 E. 53rd Street, New York.
Franco-American Audio-Visual Distribution Center, Inc., 972 Fifth Avenue, New York.
Guest Airways, 60 E. 42nd Street, New York.
National Association of Manufacturers, Film Bureau, 444 Madison Avenue, New York.

National Carbon Company, A Division of Union Carbide and Carbon Corp., 30 E. 42nd Street, New York.
New York Central Railroad, Motion Picture Bureau, 466 Lexington Avenue, New York.
New York Telephone Company, 140 West Street, New York.
Oil Industry Information Committee, 630 Fifth Avenue, Room 2010, New York.
Pan American World Airways, 80 E. 42nd Street, New York.
Shell Oil Company Public Relations Department, 50 W. 50th Street, New York.
Textile Workers Union of America, CIO, Film Division—Education Department, 99 University Place, New York.
United Air Lines, School and College Service, 80 E. 42nd Street, New York.
United States Rubber Company, Advertising Department, 1230 Avenue of the Americas, New York.
United States Steel Company, New York Film Distribution Center, 71 Broadway, New York.
Western Electric Company, Motion Picture Bureau, 195 Broadway.
Esso Standard Oil Company, Advertising-Sales Promotion Division, Pelham.
Bethlehem Steel Company, District Office, Hills Building, Syracuse.

OHIO

Bethlehem Steel Company, District Office, 555 E. Tallmadge Avenue, Akron.
Goodyear Tire & Rubber Company, Inc., Motion Picture Department, 1144 E. Market Street, Akron.
United States Steel Company, Cleveland Film Distribution Center, American Steel & Wire Division, Rockefeller Building, Cleveland.
Ohio Leather Company, 1052 North State Street, Girard.
Champion Spark Plug Company, Toledo.

OKLAHOMA

Oil Industry Information Committee, 800 Oil Capital Building, Tulsa.

PENNSYLVANIA

Kendall Refining Company, Avenue K, Main Office, Bradford.
Atlantic Refining Company, Film Library, 260 S. Broad Street, Philadelphia.
Hammerhill Paper Company, 1565 E. Lake Road, Erie.
General Electric Company, Advertising and Sales Promotion Division, Distribution Section, 1405 Locust Street, Philadelphia.
Allegheny Ludlum Steel Corp., Advertising Dept., 2020 Oliver Building, Pittsburgh.
Aluminum Company of America, Motion Picture Department, 801 Gulf Building.
Dravo Corporation, Keystone Division, Neville Island, Pittsburgh.
American Hot Dip Galvanizers' Association, Inc., 1506 First National Bank Building, Pittsburgh.
United States Steel Company, Pittsburgh Film Distribution Center, 525 William Penn Place, Pittsburgh.

RHODE ISLAND

Federal Products Corporation, 1144 Eddy Street, Providence.

SOUTH CAROLINA

Esso Standard Oil Company, Motion Picture Department, Gervais and Gist Streets, Columbia.

TEXAS

Shell Oil Company, Public Relations Department, Shell Building, Houston.

WASHINGTON

United Air Lines, District Personnel Office, 411 Douglas Building, Seattle.

WISCONSIN

Allis-Chalmers Manufacturing Co., Advertising and Industrial Press Dept., Motion Picture Section, Milwaukee.
Ampco Metal, Inc., Milwaukee.
General Electric Company, X-Ray Department, 4855 W. Electric Avenue, Milwaukee.

How to Borrow or Purchase U. S. Government Films *

Responsible persons and organizations may obtain films from the following agencies through loan or purchase. Costs of transportation and insurance are usually paid by the borrower, and he may be required to pay a small service charge to the local film library. Borrowers must comply with the regulations established by the issuing agency.

American Red Cross

To borrow or to purchase: Write to Castle Films, Inc., at the following addresses:

445 Park Avenue, New York 22, N. Y.
Field Building, Chicago 3, Ill.
Russ Building, San Francisco 4, Calif.

Air Force

To borrow: Apply to the Public Relations Office of the Air Materiel Area nearest you for further information as to availability of specific film.

When writing to your local Materiel Area, address your request to the Commanding General (Attention: Public Relations Officer) at the following places:

1. Rome Air Materiel Area, Rome, N. Y.
2. Middletown Air Materiel Area, Middletown, Pa.
3. Warner Robins Air Material Area, Warner Robins, Ga.
4. Mobile Air Material Area, Mobile, Ala.
5. San Antonio Air Materiel Area, San Antonio, Tex.
6. Oklahoma City Air Materiel Area, Oklahoma City, Okla.
7. Ogden Air Materiel Area, Ogden, Utah.
8. Spokane Air Materiel Area, Spokane, Wash.
9. Sacramento Air Materiel Area, Sacramento, Calif.
10. San Bernardino Air Materiel Area, San Bernardino, Calif.

Bureau of Mines

To borrow: Write to your nearest Bureau of Mines depository or to the Graphic Services Section, Bureau of Mines Central Experiment Station, 4800 Forbest St., Pittsburgh 13, Pa.

* Compiled by the Motion Picture Division, Library of Congress, Washington, D. C.

The Bureau of Mines depositories are as follows:

Bureau of Mines, 1241 Martin Building, Birmingham 3, Ala.
The Arkansas State Teachers College, Division of Public Relations, Conway, Ark.
Placer County Secondary Schools, Audio-Visual Aids, Auburn, Calif.
University of California, Department of Visual Instruction, Extension Division, Berkeley 4, Calif.
University of California, Department of Visual Instruction, Extension Division, Hilgard Avenue, Los Angeles 24, Calif.
Educational Film Depository, 324 North San Joaquin Street, Stockton, Calif.
University of Colorado, Bureau of Visual Instruction, Extension Division, Boulder, Col.
Akin & Bagshaw, Inc., 1425 Williams Street, Denver, Col.
New Haven Public Schools, Department of Audio-Visual Education, Winchester Avenue at Ivy Street, New Haven 11, Conn.
University of Florida, Audio-Visual Instruction, General Extension Division, Gainesville, Fla.
University System of Georgia, Audio-Visual Extension Service, Division of General Extension, 223 Walton Street, N. W., Atlanta 3, Ga.
University of Idaho, University Educational Film Service, Pocatello Idaho
University of Illinois, Visual Aids Service, Champaign, Ill.
DeVry Films & Laboratories, 1111 Armitage Ave., Chicago, Ill.
United World Films, Inc., 1801-1815 Larchmont Ave., Chicago 13, Ill.
Indiana University, Bureau of Audio-Visual Aids, Extension Division, Bloomington, Ind.
Iowa State College, Visual Instruction Service, Ames, Iowa.
The State University of Iowa, Bureau of Visual Instruction, Extension Division, Iowa City, Iowa.
The University of Kansas, Bureau of Visual Instruction, University Extension Division, Lawrence, Kans.
University of Kentucky, Bureau of Audio-Visual Aids, Department of University Extension, Lexington 29, Ky.
Cooperative Extension Work in Agriculture and Home Economics, Extension Service, Amherst, Mass.
Boston University, Division of Teaching Aids, School of Education, Boston 16, Mass.
The Public Library of Kalamazoo, 335 South Rose St., Kalamazoo Mich.
University of Michigan, Bureau of Visual Education, Extension Service, Ann Arbor, Mich.
University of Minnesota, Department of Community Service, General Extension Division, Minneapolis 14, Minn.
University of Missouri, Visual Education Service, Extension Division, Columbia, Mo.
The University of Nebraska, Bureau of Audio-Visual Aids, University Extension Division, Lincoln, Neb.
New Jersey State Museum, State House Annex, Trenton 7, N. J.
Museum of New Mexico, Museum Extension Service, Santa Fe, N. Mex.
The American Museum of Natural History, Department of Education, Central Park West at 79th St. New York, N. Y.
Syracuse University, Educational Film Library, Syracuse 10, N. Y.
North Dakota Agricultural College, Department of Correspondence Study, State College Station, Fargo, N. D.
The University of Oklahoma, Visual Education Department, Norman, Okla.
Oregon State System of Higher Education, Department of Visual Instruction, Corvallis, Ore.
The University of Texas, Visual Instruction Bureau, Division of Extension, Austin 12, Tex.
Dallas Public Library, Dallas, Tex.
Brigham Young University, Bureau of Visual Instruction, Extension Division, Provo, Utah.

Bureau of Mines, Intermountain Experiment Station, 1600 East First South St., Salt Lake City 1, Utah.
Bureau of Mines, Northwest Experiment Station, University of Washington, University Campus, Seattle 5, Wash.
State College of Washington, Bureau of Visual Teaching, Pullman, Wash.
Gallagher Film Service, Bay Theatre Building, Green Bay, Wis.
Milwaukee Public Museum, Department of Education, Milwaukee 3, Wis.
The University of Wisconsin, Bureau of Visual Instruction, University Extension Division, Madison 6, Wis.

Bureau of Prisons

To borrow: Write to the Superintendent of Vocational Education and Training, Bureau of Prisons, U. S. Department of Justice, Washington 25, D. C.

Bureau of Reclamation

To borrow or to purchase: Write to the Commissioner, Bureau of Reclamation, Department of the Interior, Washington 25, D. C.

Children's Bureau

To borrow: Write to the Children's Bureau, Social Security Administration, Federal Security Agency, Washington 25, D. C.

Note: Technical films are lent only to physicians, nurses, and medical students (when used for instructional purposes under the direction of a physician or nurse). In requesting films marked "technical," please explain how they are to be used.

Civil Aeronautics Administration

To borrow: Write to the nearest Training Film Center of the Civil Aeronautics Administration or to the Audio-Visual Training Aids Staff, A-165, Civil Aeronautics Administration, U. S. Department of Commerce, Washington 25, D. C.

See below for the nearest Training Film Center, and address your request as follows:

Assistant to the Regional Administrator (Aviation Training), Civil Aeronautics Administration (include name of city and state as listed below):

385 Madison Ave., New York 17, N. Y.
84 Marietta St., N. W., Atlanta 3, Ga.
608 South Dearborn St., Transportation Building, Chicago 5, Ill.
P. O. Box 1689, Fort Worth 1, Tex.
Ninth Floor, City Hall Building, Kansas City 6, Mo.
5651 West Manchester Ave., Los Angeles 45, Calif.
P. O. Box 3224 (Smith Tower Annex), Seattle 14, Wash.
P. O. Box 440, Anchorage, Alaska.
P. O. Box 4009, Honolulu 12, T. H.

Coast Guard

To borrow: Write to the Commander of your local Coast Guard District, or directly to the U. S. Coast Guard Headquarters, Washington 25, D. C.

The Coast Guard Districts are as follows:

First Coast Guard District, 1400 Custom House, Boston 9, Mass.
Second Coast Guard District, 232 Old Custom House, 8th and Olive Streets, St. Louis 1, Mo.
Third Coast Guard District, 42 Broadway, New York 4, N. Y.
Fourth Coast Guard District, 210 West Washington Square, Philadelphia 6, Pa.
Fifth Coast Guard District, Box 540, New Post Office Building, Norfolk 1, Va.
Seventh Coast Guard District, Dupont Building, P. O. Box 2588, Miami 30, Fla.
Eighth Coast Guard District, P. O. Box 282, New Orleans 9, La.
Ninth Coast Guard District, 1700 Keith Building, Cleveland 15, O.
Eleventh Coast Guard District, 706 Times Building, Long Beach 2, Calif.
Twelfth Coast Guard District, 907 Appraisers Building, 630 Sansome St., San Francisco 26, Calif.
Thirteenth Coast Guard District, Alaskan Building, 618 Second Ave., Seattle 4, Wash.

Department of Agriculture

To borrow: 16mm. motion pictures may be obtained from state film libraries. 35mm. films may be borrowed from the Motion Picture Service, Office of Information, U. S. Department of Agriculture, Washington 25, D. C.

To purchase: All 16mm. prints of Department of Agriculture films may be purchased from Castle Films, Division of United World Films, Inc., 30 Rockefeller Plaza, New York 20, N. Y., without authorization. Inquire directly of them for prices and delivery arrangements.

Black and white prints in 35mm. size may be purchased from DeLuxe Laboratories, Inc., 850 Tenth Avenue, New York 19, N. Y., upon authorization from the Motion Picture Service, Office of Information, U. S. Department of Agriculture, Washington 25, D. C.

Federal and other Government agencies may purchase both 16mm. and 35mm. black and white prints from DeLuxe Laboratories, Inc., and 16mm. color prints from the Calvin Company, 1105 East 15th Street, Kansas City 6, Mo., at the Department's contract price, upon authorization from the Motion Picture Service, Office of Information, U. S. Department of Agriculture, Washington 25, D. C. Inquire of the Motion Picture Service for prices and purchasing procedure.

Film libraries cooperating with the Department of Agriculture are:

Extension Service, Alabama Polytechnic Institute, Auburn, Ala.
Extension Service, University of Alaska, College, Alaska.
Visual Aids Bureau, Extension Division, University of Arizona, Tucson, Ariz.
Extension Division, State Teachers College, Conway, Ark.
Extension Service, P. O. Box 391, Little Rock, Ark.
Department of Visual Instruction, Extension Division, University of California, Berkeley, Calif.

Extension Division, University of California, 405 Hilgard Avenue, Los Angeles 24, Calif.
Association Films, 351 Turk St., San Francisco, Calif.
Bureau of Visual Instruction, University of Colorado, Boulder, Col.
Extension Service, Colorado State College of Agriculture, Fort Collins, Col.
Audio-Visual Aids Center, University of Connecticut, Storrs, Conn.
Extension Service, University of Delaware, Newark, Del.
Film Center, 915 Twelfth St., N. W. Washington 5, D. C.
Audio-Visual Instruction, Extension Division, University of Florida, Gainesville, Fla.
Visual Education Department, Agricultural Extension Service, University of Georgia, Athens, Ga.
Division of General Extension, University System of Georgia, 20 Ivy St., S. E., Atlanta 3, Ga.
Agricultural Extension Service, University of Hawaii, Honolulu 10, T. H.
Extension Service, University of Idaho, Boise, Idaho.
Visual Aids Service, University of Illinois, Champaign, Ill.
Association Films, 19 South LaSalle St., Chicago 3, Ill.
Bureau of Audio-Visual Aids, Indiana University, Bloomington, Ind.
Agricultural Extension Service, Purdue University, LaFayette, Ind.
Visual Instruction Service, Iowa State College, Ames, Iowa.
Bureau of Visual Instruction, University of Kansas, Lawrence, Kans.
Extension Service, Kansas State College, Manhattan, Kans.
Bureau of Audio-Visual Aids, University of Kentucky, Lexington 29, Ky.
Agricultural Extension Service, Louisiana State University, Baton Rouge 3, La.
Extension Service, College of Agriculture, University of Maine, Orono, Me.
Extension Service, University of Maryland, College Park, Md.
Extension Service, Massachusetts State College, Amherst, Mass.
Bureau of Visual Education, University of Michigan, Ann Arbor, Mich.
Extension Service, Michigan State College, East Lansing, Mich.
Extension Service, University of Minneosta, University Farm, St. Paul 8, Minn.
Audio-Visual Education, State Department of Education, Jackson, Miss.
Extension Service, Mississippi State College, State College, Miss.
Visual Education Service, University of Missouri, Columbia, Mo.
Extension Service, Montana A & M College, Bozeman, Mont.
Film Library, State Department of Public Instruction, Helena, Mont.
Bureau of Audio-Visual Aids, University of Nebraska, Lincoln 8, Neb.
Agricultural Extension Division, University of Nevada, Reno, Nev.
Extension Service, University of New Hampshire, Durham, N. H.
Extension Service, State College of Agriculture, New Brunswick, N. J.
New Jersey State Museum, State House Annex, Trenton 7, N. J.
Museum Film Service, Museum of New Mexico, Santa Fe, N. Mex.
Extension Service, New Mexico A & M College, State College, N. Mex.
Film Library, Motion Picture Unit, Department of Commerce, 112 State St., Albany 1, N. Y.
Office of Visual Aids, Extension Service, Cornell University, Ithaca, N. Y.
Association Films, 347 Madison Ave., New York 17, N. Y.
Bureau of Visual Instruction, University of North Carolina, Chapel Hill, N. C.
Extension Service, North Carolina State College, State College Station, Raleigh, N. C.
Department of Information, Extension Service, North Dakota Agricultural College, Fargo, N. D.
Extension Service, College of Agriculture, Ohio State University, Columbus, Ohio.
Ohio Slide and Film Exchange, State Department of Education, Columbus, Ohio.
Visual Education Department, University of Oklahoma, Norman Okla.
Extension Service, Oklahoma Agricultural & Mechanical College, Stillwater, Okla.
Department of Visual Instruction, Oregon State College, Corvallis, Oreg.
PCW Film Service, Pennsylvania College for Women, Pittsburgh 6, Pa.
Extension Service, University of Puerto Rico, Rio Piedras, P. R.
Extension Service, Rhode Island State College, Kingston, R. I.
Extension Service, Clemson Agricultural College, Clemson, S. C.

Audio-Visual Aids Bureau, Extension Division, University of South Carolina, Columbia, S. C.
Extension Service, South Dakota State College, Brookings, S. D.
Extension Division, University of South Dakota, Vermillion, S. D.
Division of University Extension, University of Tennessee, Knoxville 16, Tenn.
Visual Instruction Bureau, University of Texas, Austin 12, Tex.
Extension Service, Texas A & M College, College Station, Tex.
Association Films, 710 Burt Building, Dallas 1, Tex.
Extension Service, State College of Agriculture, Logan, Ut.
Robert Hull Fleming Museum, University of Vermont, Burlington, Vt.
Extension Service, Virginia Polytechnic Institute, Blacksburg, Va.
Bureau of Teaching Materials, State Board of Education, Richmond, Va.
Office of Visual Education, Central Washington College of Education, Ellensburg, Wash.
Extension Service, Bureau of Visual Teaching, State College of Washington, Pullman, Wash.
Audio-Visual Aids Department, The Library, West Virginia University, Morgantown, W. Va.
Bureau of Visual Instruction, University of Wisconsin, Madison 6, Wis.
Cooperative Film Library, University of Wyoming, Laramie, Wy.

For other regional libraries cooperating with the Department of Agriculture, *see also:* FARM CREDIT ADMINISTRATION; FOREST SERVICE; SOIL CONSERVATION SERVICE.

Department of Commerce

To borrow: Write to your nearest Department of Commerce field office.

Albuquerque, N. Mex., Hanosh Bldg., 203 W. Gold Ave.
Atlanta 1, Ga., P. O. Box 1595, 418 Atlanta National Bldg., 50 Whitehall St., S. W.
Baltimore 2, Md., 314 U. S. Appraisers' Stores Bldg., 103 South Gay St.
Boston 9, Mass., 1800 Customhouse, 9 India St.
Buffalo 3, N. Y., 242 Federal Bldg., 117 Ellicott St.
Butte, Mont., 301A O'Rourke Estate Bldg., 14 W. Granite St.
Charleston 3, S. C., 310 Peoples Bldg., 18 Broad St.
Charleston, W. Va., Rm. 2, Federal Court House Annex.
Charlotte 2, N. C., 112½ E. Fourth St.
Cheyenne, Wy., 304 Federal Office Bldg., 21st Street & Carey Ave.
Chicago 4, Ill., 501 McCormick Bldg., 332 South Michigan Ave.
Cincinnati 2, Ohio, 1204 Chamber of Commerce Bldg., Fourth and Race Streets.
Cleveland 14, Ohio, 215 Union Commerce Bldg., Euclid Ave. at E. 9th St.
Dallas 2, Tex., 602 Santa Fe Bldg., 1114 Commerce St.
Denver 2, Col., 210 Boston Bldg., 828 17th St.
Detroit 26, Mich., 1038 New Federal Bldg., 230 W. Fort St.
El Paso 7, Tex., 12 Chamber of Commerce Bldg.
Fargo, N. D., 212 Walker Bldg., 621 First Avenue, North.
Hartford 1, Conn., 224 Post Office Bldg., 135 High St.
Houston 14, Tex., 602 Federal Office Bldg., Fannin at Franklin St.
Jacksonville 1, Fla., 425 Federal Bldg., 311 West Monroe St.
Juneau, Alaska, 300 Federal & Territorial Bldg., Fourth and Seward Streets.
Kansas City 6, Mo., 2611 Fidelity Bldg., 911 Walnut St.
Los Angeles 12, Calif., 1540 U. S. Post Office & Court House, 312 North Spring St.
Louisville 1, Ky., 631 Federal Bldg., Sixth and Broadway.
Memphis 3, Tenn., 229 Federal Bldg., Madison at Front St.
Miami 32, Fla., 947 Seybold Bldg., 36 N. E. First St.
Milwaukee 1, Wis., 700 Federal Bldg., 517 E. Wisconsin Ave.

Minneapolis 1, Minn., 1234 Metropolitan Life Bldg., Second Ave. S. & Third St.
Mobile, Ala., 308 Federal Bldg.
New Orleans 12, La., 1508 Masonic Temple Bldg., 333 St. Charles Ave.
New York 1, N. Y., 60th Fl. Empire State Bldg., 350 Fifth Ave.
Oklahoma City 2, Okla., 901-905 Petroleum Bldg.
Omaha 2, Neb., 918 City National Bank Bldg., 405 S. 16th St.
Philadelphia 2, Pa., 719 Pennsylvania Bldg., 42 S. 15th St.
Phoenix 8, Ariz., 417 Security Bldg., 234 N. Central Ave.
Pittsburgh 19, Pa., 1013 New Federal Bldg., Seventh Ave. & Grant St.
Portland 4, Oreg., 217 Old U. S. Court House, 520 S. W. Morrison St.
Providence 3, R. I., 206 Custom House, 24 Weybossett St.
Reno, Nev., Elks Club Bldg., 50 Sierra St.
Richmond 19, Va., Room 2, Mezzanine, 801 E. Broad St.
St. Louis 1, Mo., 107 New Federal Bldg., 1114 Market St.
Salt Lake City 1, Utah, 508 Post Office Bldg.
San Francisco 11, Calif., 307 Customhouse, Washington and Battery Streets.
Savannah, Ga., 218 U. S. Court House & Post Office Bldg.
Seattle 4, Wash., 809 Federal Office Bldg., First and Marion Streets.

Farm Credit Administration, Department of Agriculture

To borrow: Write to your Farm Credit Administration District Information Office.

To purchase: Follow instructions for *DEPARTMENT OF AGRICULTURE.*

Farm Credit Administration, District No. 1, Springfield 2, Mass. (Includes Maine, New Hampshire, Vermont, Massachusetts, Connecticut, Rhode Island, New York, and New Jersey.)
Farm Credit Administration, District No. 2, Baltimore 3, Md. (Includes Pennsylvania, Maryland, Delaware, Virginia, West Virginia, District of Columbia, and Puerto Rico.)
Farm Credit Administration, District No. 3, Box 1499, Columbia 19, S. C. (Includes North Carolina, South Carolina, Georgia, and Florida.)
Farm Credit Administration, District No. 4, Louisville 1, Ky. (Includes Indiana, Ohio, Kentucky, and Tennessee.)
Farm Credit Administration, District No. 5, New Oreleans 7, La. (Includes Alabama, Mississippi, and Louisiana.)
Farm Credit Administration, District No. 6, St. Louis 3, Mo. (Includes Illinois, Missouri, and Arkansas.)
Farm Credit Administration, District No. 7, St. Paul 1, Minn. (Includes Michigan, Wisconsin, Minnesota, and North Dakota.)
Farm Credit Administration, District No. 8, Omaha 1, Neb. (Includes Iowa, Nebraska, South Dakota, and Wyoming.)
Farm Credit Administration, District No. 9, Wichita 2, Kans. (Includes Kansas, Oklahoma, Colorado, and New Mexico.)
Farm Credit Administration, District No. 10, Houston 1, Tex. (Includes Texas.)
Farm Credit Administration, District No. 11, Box 525, Berkeley 1, Calif. (Includes Utah, Arizona, Nevada, and California.)
Farm Credit Administration, District No. 12, Spokane 8, Wash. (Includes Montana, Idaho, Washington, and Oregon.)

Federal Security Agency

To borrow or to purchase: Write to the Staff Development Section, Federal Security Agency, Washington 25, D. C.

Fish and Wildlife Service

To borrow: Write to the Fish and Wildlife Service, The Merchandise Mart, Chicago 54, Ill.

To purchase: The only film which can be purchased is on the rural control of rats, *Vandals of the Night.* Write to the address given above.

Forest Service, Department of Agriculture

To borrow: Write to your local Regional Forester, U. S. Forest Service, at the addresses below:

To purchase: Follow instructions for *DEPARTMENT OF AGRICULTURE.*

Federal Building, Missoula, Mont.
Post Office Building, Denver 2, Col.
Post Office Building, Albuquerque, N. Mex.
Forest Service Building, Ogden, Utah.
630 Sansome Street, San Francisco 11, Calif.
Post Office Building, Portland 8, Oreg.
Bankers Securities Building, Philadelphia 7, Pa.
Glenn Building, Atlanta 3, Ga.
Madison Building, Milwaukee 3, Wis.
Federal and Territorial Building, Juneau, Alaska.
1443 Federal Building, Los Angeles 12, Calif.

Geological Survey

To borrow: Write to the Director, Geological Survey, Department of the Interior, Washington 25, D. C.

Institute of Inter-American Affairs

To borrow: Apply for films from the Executive Administrative Assistant, The Institute of Inter-American Affairs, 499 Pennsylvania Avenue, N. W., Washington 25, D. C.

To purchase: Write to the above address for procedure bulletin.

Library of Congress

To borrow: Apply to your local film library.

To purchase: Write to the Motion Picture Division, Library of Congress, Washington 25, D. C.

Marine Corps

To borrow: Write to the U. S. Marine District Headquarters Recruiting Office in your locality. Your local Marine Corps Recruiting Office will lend you the films, if available, and may be able to project them for your organization.

See below for the address of the nearest Marine Corps Recruiting Division and District, and address your request as follows:

Officer in Charge, U. S. Marine Corps (include name of division or district, city and state as listed below):

NORTHEASTERN RECRUITING DIVISION, Room 1000, New Custom House, 2nd and Chestnut Street, Philadelphia 6, Pa.

District Headquarters Recruiting Station, Room 411, Post Office Building, Albany 1, N. Y.

District Headquarters Recruiting Station, Room 325, Post Office Building, Fayette and Calvert Streets, Baltimore 2, Md.

District Headquarters Recruiting Station, Room 702, Post Office Building, Post Office Square, Boston 9, Mass.

District Headquarters Recruiting Station, Room 405, Post Office Building, Swan and Ellicott Streets, Buffalo 3, N. Y.

District Headquarters Recruiting Station, Rooms 218, 221, 223, Post Office Building, 135 High St., Hartford 1, Conn.

District Headquarters Recruiting Station, Room B-39, Post Office Building, Federal Square, Newark, N. J.

District Headquarters Recruiting Station, Room 1104, Federal Office Building, 90 Church St., New York 7, N. Y.

District Headquarters Recruiting Station, Room 902, New Custom House, 2nd and Chestnut Streets, Philadelphia 6, Pa.

District Headquarters Recruiting Station, Room 1, Old Post Office Building, Fourth Avenue and Smithfield St., Pittsburgh 19, Pa.

District Headquarters Recruiting Station, Rooms 8 and 10, Federal Court House Building, 76 Pearl St., Portland 3, Me.

District Headquarters Recruiting Station, Rooms 300 and 303, First Federal Savings and Loans Association Building, 224 East Broad St., Richmond 19, Va.

District Headquarters Recruiting Station, Suite 1100, 1400 Pennsylvania Ave., N. W., Washington, D. C.

SOUTHEASTERN RECRUITING DIVISION, Room 1104, Atlanta National Building, 50 Whitehall Street, Atlanta 3, Ga.

District Headquarters Recruiting Station, Rooms 207 and 212, A. C. Rhodes Building, 78 Marietta St., Atlanta 3, Ga.

District Headquarters Recruiting Station, 210 Farley Building, Birmingham 3, Ala.

District Headquarters Recruiting Station, 1510 Gervais St., Columbia 5, S. C.

District Headquarters Recruiting Station, Room 508, Post Office Building, Jackson 99, Miss.

District Headquarters Recruiting Station, Rooms 251 and 252, Post Office Building, Jacksonville 1, Fla.

District Headquarters Recruiting Station, Rooms 408 and 414, Bibb Building, Broadway and Cherry Streets, Macon, Ga.

District Headquarters Recruiting Station, Room 23, U. S. Court House Building, 8th and Broad Streets, Nashville 3, Tenn.

District Headquarters Recruiting Station, Rooms 310, 312, and 314, Post Office Building, Raleigh, N. C.

CENTRAL RECRUITING DIVISION, Room 753, U. S. Court House, 225 South Clark Street, Chicago 4, Ill.

District Headquarters Recruiting Station, Room 242, Post Office Building, 5th and Walnut Streets, Cincinnati 2, Ohio.

District Headquarters Recruiting Station, Room 522, Federal Building, Public Square and Superior Ave., Cleveland 15, Ohio.

District Headquarters Recruiting Station, Room 370, New Federal Building, 213 West Lafayette Ave., Detroit 26, Mich.

District Headquarters Recruiting Station, Cabell County Court House, Huntington 1, W. Va.

District Headquarters Recruiting Station, Federal Building, Ohio and Pennsylvania Ave., Indianapolis, Ind.

District Headquarters Recruiting Station, Room 614, Federal Building, 6th and Broadway, Louisville 1, Ky.

District Headquarters Recruiting Station, Room 454, Post Office Building, 517 East Wisconsin Ave., Milwaukee 2, Wis.

Midwestern Recruiting Division, Room 937, U. S. Court and Custom House Building, 1114 Market St., St. Louis 1, Mo.

District Headquarters Recruiting Station, Room 107, Old Customs House, 16th and Arapahoe Streets, Denver 2, Col.

District Headquarters Recruiting Station, Room 103, Old Federal Building, Fifth and Court Streets, Des Moines 9, Iowa.

District Headquarters Recruiting Station, Room 249, U. S. Court House, 811 Grand Ave., Kansas City 6, Mo.

District Headquarters Recruiting Station, Room 172, Federal Office Building, Washington and Second Ave., South Minneapolis, Minn.

District Headquarters Recruiting Station, Room 324, Omaha Loan and Building Association Building, 1504 Dodge St., Omaha 2, Neb.

Southern Recruiting Division, Room 509-33, Terminal Annex Building, 200 Houston St., Dallas 2, Tex.

District Headquarters Recruiting Station, Room 400, Terminal Annex Building, 200 Houston St., Dallas 2, Tex.

District Headquarters Recruiting Station, 404 Post Office Building, San Jacinto and Rusk Streets, Houston 1, Tex.

District Headquarters Recruiting Station, Room 69, U. S. Federal Building, 4th and Arch Streets, Little Rock, Ark.

District Headquarters Recruiting Station, Room 109, U. S. Customs House, 423 Canal St., New Orleans 16, La.

District Headquarters Recruiting Station, Room 326, Federal Building, 3rd and Robinson Streets, Oklahoma City 2, Okla.

District Headquarters Recruiting Station, Room 407, Post Office Building, 615 East Houston St., San Antonio 6, Tex.

Western Recruiting Division, Room 404, Building No. 1, 100 Harrison St., San Francisco 6, Calif.

District Headquarters Recruiting Station, 28 West Granite St., Butte, Mont.

District Headquarters Recruiting Station, Room G-36, Post Office and Court House, Temple and Main Streets, Los Angeles 12, Calif.

District Headquarters Recruiting Station, Room 208, New U. S. Court House, South West Broadway and Main Streets, Portland 5, Oreg.

District Headquarters Recruiting Station, 90 Golden Gate Ave., San Francisco 2, Calif.

District Headquarters Recruiting Station, Rooms 201 and 206, Empress Building, 1016½ Second Ave., Seattle 4, Wash.

Maritime Commission

To borrow: Write to the Motion Picture Service, Department of Agriculture, Washington 25, D. C.

To purchase: Write to the Public Information Division, U. S. Maritime Commission, Washington 25, D. C.

Navy Department, Office of Public Information

General interest films are released through the Navy Department and Naval District Headquarters for the information of the public.

To borrow: Write to the Motion Picture Section, Office of Public Information, Executive Office of the Secretary, Navy Department, Washington 25, D. C. or to whichever of the following District Public Information Offices of the Navy Department is nearest you:

First Naval District, 495 Summer St., Boston 10, Mass.
Third Naval District, 90 Church St., New York 7, N. Y.
Fourth Naval District, U. S. Naval Base, Building No. 6, Philadelphia, Pa.
Fifth Naval District, Naval Operating Base, Norfolk 11, Va.
Sixth Naval District, U. S. Naval Base, Navy Yard, Charleston, S. C.
Seventh Naval District, Naval Air Station, Jacksonville, Fla.
Eighth Naval District, Federal Office Building, New Orleans 12, La.
Ninth Naval District, U. S. Naval Base, Great Lakes, Ill.
Tenth Naval District, Navy Headquarters, San Juan, P. R.
Eleventh Naval District, Navy Headquarters Building, San Diego 30, Calif.
Twelfth Naval District, Federal Office Building, San Francisco 2, Calif.
Thirteenth Naval District, U. S. Naval Station, Seattle 99, Wash.
Fourteenth Naval District, Box 135, Navy No. 128, Pearl Harbor, Territory of Hawaii, c/o Fleet Post Office, San Francisco, Calif.
Fifteenth Naval District, Box 108, Fort Amador, C. Z.
Seventeenth Naval District, Kodiak, Alas.

To purchase: Only the films so indicated are for sale. For information concerning their purchase, write to the Chief, Visual Education Section, U. S. Office of Education, Washington 25, D. C.

Navy Department

Training films are released through the U. S. Office of Education for educational purposes.

To borrow: Generally available on loan basis through local film libraries.

To purchase: Write to Castle Films, Inc., at the following addresses:

445 Park Avenue, New York 22, N. Y.
Field Building, Chicago 3, Ill.
Russ Building, San Francisco 4, Calif.

Office of Education

To borrow: Generally available on loan basis through local film libraries.

To purchase: Write to Castle Films, Inc., at the following addresses:

445 Park Avenue, New York 22, N. Y.
Field Building, Chicago 3, Ill.
Russ Building, San Francisco 4, Calif.

Office of Indian Affairs

To borrow: Write to Haskell Institute, Lawrence, Kans.

Office of Inter-American Affairs

The Office of Inter-American Affairs, one-time Office of the Coordinator of Inter-American Affairs, was terminated by Executive Order 9710 of April 10, 1946, and the motion pictures were transferred to the Department of State. Most of these films will be made available to the Library of Congress for distribution purposes, subject to necessary clearances (copyright and other).

To borrow: Apply to your local film library.

To purchase: Write to the Motion Picture Division, Library of Congress, Washington 25, D. C.

Office of War Information

Abolished by Executive Order 9608 of August 31, 1945. OWI overseas films, as part of foreign information activities, were transferred to the Department of State. Most of these films will be made available to the Library of Congress for distribution purposes, subject to necessary clearances (copyright and other).

To borrow: Apply to your local film library.

To purchase: Write to the Motion Picture Division, Library of Congress, Washington 25, D. C.

Pan American Union

Prior to July 1, 1947, the Pan American Union made its complete library of films available to the public. However, since that time they have distributed their collection to various film libraries and it is presumed that such libraries or centers will lend the films at rates in line with their usual rental policies. A catalog of films available may be obtained by addressing the Chief, Visual Education Section, Pan American Union, Washington 6, D. C.

Public Health Service

To borrow: Write to your state or local health department. The addresses of the state offices are as follows:

State Health Officer, Alabama State Department of Health, Montgomery, Ala.
Commissioner of Health, Alaska Territorial Department of Health, Juneau, Alaska.
Superintendent of Public Health, Arizona State Department of Health, Phoenix, Ariz.
State Health Officer, Arkansas State Board of Health, Little Rock, Ark.
Director of Public Health, California State Department of Public Health, San Francisco, Calif.
Secretary and Executive Officer, Colorado State Division of Public Health, Denver, Col.
Commissioner of Health, Connecticut State Department of Health, Hartford, Conn.
Executive Secretary, Delaware State Board of Health, Dover, Del.
Health Officer, District of Columbia Health Department, Washington, D. C.
State Health Officer, Florida State Board of Health, Jacksonville, Fla.
Director, Georgia Department of Public Health, Atlanta, Ga.
President of Board of Health, Territory of Hawaii Board of Health, Honolulu, T. H.
Director of Public Health, Idaho Department of Public Health, Boise, Idaho.
Director of Public Health, Illinois State Department of Public Health, Springfield, Ill.
State Health Commissioner, Indiana State Board of Health, Indianapolis, Ind.
State Commissioner of Health, Iowa State Department of Health, Des Moines, Iowa.
Secretary and Executive Officer, Kansas State Board of Health, Topeka, Kans.
State Health Commissioner, Kentucky State Department of Health, Louisville, Ky.
State Health Officer, Louisiana State Department of Health, New Orleans, La.
Director of Health, Maine State Bureau of Health, Augusta, Me.
Director, Maryland State Department of Health, Baltimore, Md.

Commissioner of Public Health, Massachusetts Department of Public Health, Boston, Mass.
Commissioner of Health, Michigan Department of Health, Lansing, Mich.
Secretary and Executive Officer, Minnesota Department of Health, St. Paul, Minn.
Secretary and Executive Officer, Mississippi State Board of Health, Jackson, Miss.
State Health Commissioner, Missouri State Board of Health, Jefferson City, Mo.
Secretary and Executive Officer, Montana State Board of Health, Helena, Mont.
Director of Health, Nebraska Department of Health, Lincoln, Neb.
State Health Officer, Nevada State Department of Health, Carson City, Nev.
State Health Officer, New Hampshire State Health Department, Concord, N. H.
Director of Health, New Jersey State Department of Health, Trenton, N. J.
Director of Health, New Mexico Department of Public Health, Santa Fe, N. Mex.
Commissioner of Health, New York State Department of Health, Albany, N. Y.
Secretary and State Health Officer, North Carolina State Board of Health, Raleigh, N. C.
State Health Officer, North Dakota State Department of Health, Bismarck, N. D.
State Director of Health, Ohio Department of Health, Columbus, Ohio.
Commissioner of Health, Oklahoma State Health Department, Oklahoma City, Okla.
State Health Officer, Oregon State Board of Health, Portland, Oreg.
Secretary of Health, Pennsylvania State Department of Health, Harrisburg, Pa.
Commissioner of Health, Puerto Rico Department of Health, San Juan, P. R.
Director of Health, Rhode Island Department of Health, Providence, R. I.
State Health Officer, South Carolina State Board of Health, Columbia, S. C.
Superintendent of State Board of Health, South Dakota State Board of Health, Pierre, S. D.
Commissioner of Public Health, Tennessee Department of Public Health, Nashville, Tenn.
State Health Officer, Texas State Department of Health, Austin, Tex.
State Health Commissioner, Utah State Department of Health, Salt Lake City, Utah.
Secretary and Executive Officer, Vermont Department of Public Health, Burlington, Vt.
State Health Commissioner, Virginia Department of Health, Richmond, Va.
Commissioner of Health, Virgin Islands Department of Health, Charlotte Amalie, Virgin Islands.
State Director of Health, Washington State Department of Health, Seattle, Wash.
State Health Commissioner, West Virginia State Department of Health, Charleston, W. Va.
State Health Officer, Wisconsin State Board of Health, Madison, Wis.
State Health Officer, Wyoming State Department of Health, Cheyenne, Wy.

For the film *Routine Admission Chest X-ray in General Hospitals*, write to the District Director, U. S. Public Health Service, at Headquarters office in the District which includes your state. The Public Health Service Districts are constituted as follows:

No. 1 Comprising the States of Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont and Delaware. Headquarters office: Sub-Treasury Building, 15 Pine Street, New York 5, N. Y.

No. 2 Comprising the States of Maryland, North Carolina, South Carolina, Virginia, West Virginia, and the District of Columbia. Headquarters office: State-Planters Bank Building, Richmond 19, Va.

No. 3 Comprising the States of Illinois, Indiana, Michigan, Ohio, Wisconsin, and Kentucky. Headquarters office: Room 852, U. S. Customhouse, 610 South Canal Street, Chicago 7, Ill.

No. 4 Comprising the States of Alabama, Florida, Georgia, Louisiana, Mississippi, Tennessee, and Arkansas. Headquarters office: 707 Pere Marquette Building, New Orleans 12, La.

No. 5 Comprising the States of Washington, Oregon, California, Nevada, Arizona, Territory of Alaska, and the Territory of Hawaii. Headquarters office: 1407 U. S. Appraisers Building, San Francisco 11, Calif.
No. 6 Consisting of Puerto Rico and the Virgin Islands. Headquarters office: San Juan 18, P. R.
No. 7 Comprising the States of North Dakota, South Dakota, Nebraska, Kansas, Iowa, Minnesota, and Missouri. Headquarters office: 405 East 13th Street, Kansas City 6, Mo.
No. 8 Comprising the States of Montana, Idaho, Wyoming, Utah, and Colorado. Headquarters office: Room 615, Colorado Building, Denver 2, Col.
No. 9 Comprising the States of Texas, Oklahoma, and New Mexico. Headquarters office: 114 Commerce, Room 513, Dallas 2, Tex.

Official correspondents should be addressed as follows:

District Director, U. S. Public Health Service District No. –, street address, city and state.

To purchase: Ask the Surgeon General, U. S. Public Health Service, Washington 25, D. C., for authorization forms if required. Place your order with the laboratory selling the particular film you want:

Castle Films, Inc., 445 Park Avenue, New York 22, N. Y.
Consolidated Film Industries, 959 Seward St., Hollywood, Calif.
DeLuxe Laboratories, 850 Tenth Ave., New York 19, N. Y.
Precision Film Laboratories, 21 West 46th St., New York 19, N. Y.
Start Films, Howard & Center Streets, Baltimore, Md.

Savings Bonds Division

To borrow: Write to the Director of Savings Bonds in your state or to the Motion Picture Section, Savings Bonds Division, U. S. Treasury Department, Room 738, Washington Building, Washington 25, D. C.

State offices and branches of the Savings Bonds Division are as follows:

2027 Comer Building, Birmingham 3, Ala.
215 New Post Office Building, Phoenix, Ariz.
101 Old Post Office Building, Little Rock, Ark.
745 Monadnock Building (Northern California), San Francisco 5, Calif.
621 South Spring St. (Southern California), Los Angeles 14, Calif.
719 Equitable Building, 17th and Stout Streets, Denver 2, Col.
36 Pearl Street, Room 523, Hartford 3, Conn.
1064 Hotel duPont Building, Wilmington 99, Del.
630 Washington Building, Washington 5, D. C.
404-08 Federal Building, Jacksonville 1, Fla.
1202 C&S National Bank Building, Atlanta 3, Ga.
634 Idaho First National Bank Building, Boise, Idaho.
300 Bankers Building, 105 West Adams St., Chicago 3, Ill.
Branch office: 605 Myers Building, Springfield, Ill.
832 Illinois Building, Indianapolis 4, Ind.
800 Walnut Building, Des Moines 8, Iowa.
208 Federal Building, Topeka 60, Kans.
808 Second National Bank Building, Ashland, Ky.
Branch office: 510 Republic Building, Louisville 2, Ky.
515 Federal Building, P. O. Box 83, New Orleans 12, La.
233 Post Office Building, 125 Forest Avenue, Portland 3, Me.

601 Maryland Trust Building, Baltimore 2, Md.
79 Milk St., Boston 9, Mass.
Branch office: 806 Third National Bank Building, Springfield, Mass.
1702 United Artists Building, Detroit 26, Mich.
510 Northwestern Bank Building, Minneapolis 2, Minn.
526 Federal Building, P. O. Box 747, Jackson 106, Miss.
Post Office Building, Jefferson City, Mo.
Branch offices: 319 Old Customs House, 815 Olive Street, St. Louis 2, Mo.
Federal Reserve Bank Building, Kansas City 6, Mo.
28 Union Bank Building, Helena, Mont.
Branch office: 302 Federal Building, Great Falls, Mont.
636 World-Herald Building, Omaha 2, Neb.
150 North Virginia Street, Room 20, Reno, Nev.
77 Market Street, Manchester, N. H.
972 Broad Street, Newark 2, N. J.
Branch office: 709 Market Street, Camden, N. J.
101 Federal Building, Albuquerque, N. Mex.
Branch office: 114 Shelby St., Santa Fe, N. Mex.
253 Broadway, New York 7, N. Y.
Branch offices: 1404 Marine Trust Building, Buffalo 3, N. Y.
403 Merchants Bank Building, Elmira, N. Y.
75 State St., Albany 7, N. Y.
200 Marine Midland Building Binghamton, N. Y.
917 O. C. S. B. Building, Syracuse 2, N. Y.
P. O. Box 734, Poughkeepsie, N. Y.
New Court House, Mineola, L. I., N. Y.
204 Sutton Building, P. O. Box G-2, Greensboro, N. C.
Nierling Block, 108½ First Street East, Jamestown, N. D.
61 Union Commerce Lobby, Cleveland 14, Ohio.
Branch office: 1028 Provident Bank Building, Cincinnati, Ohio.
426 Key Building, 3rd & Harvey Streets, Oklahoma City 2, Okla.
1006 American Bank Building, Portland 5, Oreg.
21 South 12th Street, Philadelphia 7, Pa.
Branch office: 1204 Park Building, 5th Avenue & Smithfield Street, Pittsburgh 22, Pa.
1608 Industrial Trust Building, Providence 3, R. I.
Farm Credit Administration Building, 1401 Hampton Street, Columbia 29, S. C.
305 Federal Building, Sioux Falls, S. D.
330 Third National Bank Building, 170 Fourth Avenue, Nashville 3, Tenn.
Room 523, 1114 Commerce Street, Dallas 2, Tex.
462 Federal Building, Salt Lake City 1, Utah.
Hotel Van Ness, Burlington, Vt.
Schmidt Building, 7th & Franklin Streets, Richmond, Va.
459 Federal Office Building, Seattle 4, Wash.
105 Federal Building, Charleston 1, W. Va.
735 North Water Street, Room 630, Milwaukee 2, Wis.
301 Federal Building, Cheyenne, Wy.

Note: All correspondence to state offices should be addressed to the State or Branch Director, U. S. Savings Bonds Division, street address, city and state.

Secret Service

To borrow: Write to the Field Offices of the Secret Service or to the U. S. Secret Service, Department of the Treasury, Washington 25, D. C.

Below is a list of the Field Offices of the U. S. Secret Service, includ-

ing the states which comprise the Districts. Your requests should be addressed to the Supervising Agent, U. S. Secret Service District No. __, and followed by the address which includes your state.

No. 1 1023 Post Office Building, Boston, Mass. (Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut)
No. 2 Room 300, 253 Broadway, New York 7, N. Y. (New York, Northern New Jersey, Puerto Rico)
No. 3 900 U. S. Custom House, 2nd and Chestnut Streets, Philadelphia, Pa. (Pennsylvania, Southern New Jersey, Delaware)
No. 4 (Combined with Districts 2 and 3)
No. 5 Room 1434 Main Treasury Building, Washington 25, D. C. (Maryland, Virginia, West Virginia, North Carolina, District of Columbia)
No. 6 404 Atlanta National Bank Building, 50 Whitehall Street, Atlanta, Ga. (South Carolina, Georgia, Florida, Alabama)
No. 7 425 Post Office Building, Louisville 1, Ky. (Kentucky, Tennessee)
No. 8 1044 Federal Building, Detroit 26, Mich. (Michigan, Ohio)
No. 9 808 New Post Office Building, Chicago 80, Ill. (Illinois, Wisconsin, Indiana)
No. 10 121-A Santa Fe Building, Dallas 1, Tex. (Texas, Louisiana, Mississippi)
No. 11 809 U. S. Courts Building, Kansas City, Mo. (Missouri, Oklahoma, Arkansas, Kansas)
No. 12 1407 Main Post Office Building, St. Paul, Minn. (Minnesota, North Dakota, South Dakota, Iowa, Nebraska)
No. 13 154 U. S. Custom House Building, Denver, Col. (Colorado, New Mexico, Wyoming, Utah)
No. 14 2303–100 McAllister Street, San Francisco, Calif. (California, Nevada, Arizona, Hawaii)
No. 15 221 U. S. Court House, Seattle, Wash. (Washington, Oregon, Idaho, Montana, Alaska)

Social Security Administration

To borrow: Write to the Social Security Administration, Federal Security Agency, Washington 25, D. C., or to the regional office nearest your city or town.

When writing to the regional office, you should address your request to the Director, Social Security Administration, Region __, street, and city and state.

Region

1 120 Boylston St., Boston 16, Mass.
2–3 11 West 42nd St., New York 18, N. Y.
4 Lenox Building, 1523 L Street, N. W., Washington 25, D. C.
5 1100 Chester Ave., Cleveland 14, Ohio.
6 Room 2200, 188 West Randolph St., Chicago 1, Ill.
7 441 West Peachtree St., Atlanta 3, Ga.
8 Midland Bank Building, 4th Street & 2nd Ave., Minneapolis 1, Minn.
9 1006 Grand Ave., Kansas City 6, Mo.
10 North Presa & East Houston Streets, San Antonio 5, Tex.
11 321 Equitable Building, 730 17th St., Denver 2, Col.
12 785 Market St., San Francisco 3, Calif.

Soil Conservation Service, Department of Agriculture

To borrow: Write to your local Chief, Regional Division of Information, Soil Conservation Service, at the addresses given below.

To purchase: Follow instructions for *DEPARTMENT OF AGRICULTURE.*

Center Building, 6800–16 Market St., Upper Darby, Pa.
Montgomery Building, 224½ Trimmer St., Spartanburg, S. C.
4650 North Port, Washington Road, Milwaukee 12, Wis.
3500 Cleburne Road, Fort Worth 1, Tex.
Rudge & Guenzell Building, Lincoln 1, Neb.
106 South Broadway, Albuquerque, N. Mex.
Pacific Building, 520 Southwest Yamhill St., Portland 7, Oreg.

Tennessee Valley Authority

To borrow: Write to Film Unit, Tennessee Valley Authority, New Sprankle Building, Knoxville, Tennessee. Written assurance must be given that the films will not be used for commercial purposes.

United Nations

The United Nations has issued several motion pictures and filmstrips.

To borrow or to purchase: Follow instructions given with each film. For information on United Nations films, write to United Nations Films and Visual Education Division, Room 945, The United Nations, New York, New York.

Veterans' Administration

To borrow: Apply to the Veterans' Administration Branch Office in your area, or to the Visual Aids Division, Public Relations Service, Veterans' Administration, Washington 25, D. C. These films are available also from the U. S. Department of Agriculture state depositories.

When requesting films from the Branch Office, write to the Director of Public Relations, Veterans' Administration Branch Office No. – at the following addresses:

No. 1 55 Tremont St., Boston 8, Mass.
No. 2 346 Broadway, New York 13, N. Y.
No. 3 128 North Broad St., Philadelphia 2, Pa.
No. 4 900 North Lombardy St., Richmond 20, Va.
No. 5 Atlanta 3, Ga.
No. 6 52 South Starling St., Columbus 8, Ohio.
No. 7 226 West Jackson Blvd., Chicago 6, Ill.
No. 8 Fort Snelling, St. Paul 11, Minn.
No. 9 420 Locust St., St. Louis 2, Mo.
No. 10 1114 Commerce St., Dallas 2, Tex.
No. 11 821 Second Ave., Seattle 4, Wash.
No. 12 180 New Montgomery St., San Francisco 5, Calif.
No. 13 P. O. Box 1260, Denver Federal Center, Denver 1, Col.

Weather Bureau

To borrow: Write to the Weather Bureau, U. S. Department of Commerce, Washington 25, D. C.

Manufacturers and Producers of Audio-Visual Equipment and Supplies *

As far as possible, it is recommended that visual aid equipment and supplies be purchased from reliable local dealers. This will usually provide a near-by point for servicing and repair and also a close and convenient source for new information. It would be impractical to list all stores and departments dealing with art supplies, stationery, photography, and other related equipment and supplies. The following is, however, a partial listing of known producers and distributors of visual aids in the United States.

Slide & Filmstrip Projector Manufacturers

Ampro Corp., 2839 North Western Ave., Chicago 18, Ill.
Argus, Inc., Ann Arbor, Mich.
Bausch & Lomb Optical Co., 635 St. Paul, Rochester 2, N. Y.
Bell and Howell Co., 7100 McCormick, Chicago 45, Ill.
Eastman Kodak Co., 343 State St., Rochester 4, N. Y.
Golde Manufacturing Co., 4888 North Clark St., Chicago, Ill.
Society for Visual Education, 1345 West Diversey, Chicago 14, Ill.
American Optical Co., Chelsea 50, Mass.
Viewlex, Inc., 35–01 Queens Blvd., Long Island City 1, N. Y.
Vokar Corp., 7300 Huron River Drive, Dexter, Mich.

16mm. Sound Motion Picture Projector Manufacturers

Ampro Corp., 2839 North Western Ave., Chicago 18, Ill.
Bell and Howell Co., 7100 McCormick, Chicago 45, Ill.
The Calvin Corp., 1105 East 15th St., Kansas City 6, Mo.
Eastman Kodak Co., 343 State St., Rochester 4, N. Y.
Holmes Projector Co., 1815 N. Orchard St., Chicago 14, Ill.
Radio Corporation of America, Engineering Products, Front & Cooper Sts., Camden, N. J.
Victor Animatograph Corp., Kahl Bldg., Davenport, Iowa
Revere Camera Co., 320 East 21st St., Chicago 16, Ill.

16mm. Continuous Display Motion Picture Projector Manufacturers

Ampro Corp., 2839 North Western Ave., Chicago 18, Ill.
Busch Film and Equipment Co., 27 Jarvis Yawkey St., Saginaw, Mich.
Technical Service, Inc., 30865 Five Mile Road, Livonia, Mich.
Triangle Continuous Daylight Projector Co., 5307 North Ravenswood Ave., Chicago 40, Ill.

Sound Slidefilm Projector Manufacturers

Aids Equipment Corp., 131 West 52nd St., New York 19, N. Y.
Audio Master Co., 341 Madison Ave., New York 17, N. Y.
Automatic Projection Corp., 29 West 35th St., New York, N. Y.
L. E. Davison Picture Service, 28 Maple St., Angola, N. Y.
DuKane Corp., St. Charles, Ill.

* Courtesy *Business Screen*, Chicago, Ill.

Illustravox Div., Electro Engineering & Manufacturing Co., 627 West Alexandrine, Detroit 1, Mich.
O. J. McClure Talking Pictures, 1115 West Washington Blvd., Chicago 7, Ill.
The Calvin Corp., 1105 East 15th St., Kansas City 6, Mo.
Synchromatic Products Corp., 766 Broadway, Bayonne, N. J.
Viewlex, Inc., 35–01 Queens Blvd., Long Island City 1, N. Y.

Continuous Display Slide Projectors

Adslide Projector Co., 3726 Montrose Ave., Chicago 18, Ill.
Eastman Kodak Co., 343 State St., Rochester 4, N. Y.
Marks & Fuller, Inc. (Iconovisor), 70 Scio St., Rochester, N. Y.
Picture Recording Co., 1420 Lawrence Ave., Chicago 40, Ill.
Spindler & Sauppe, Inc. (Selectroslide), 2201 Beverly Blvd., Los Angeles 4, Calif.
Technical Service, Inc., 30865 Five Mile Road, Livonia, Mich.

Projection Screens (Wall, Table, Tripod and Ceiling Models)

Aurora Industries, Inc., 413 West Erie St., Chicago 10, Ill.
Commercial Picture Equipment, Inc., 1802 West Columbia, Chicago 26, Ill.
Da-Lite Screen Co. Inc., 2711 North Pulaski Rd., Chicago 39, Ill.
Eastman Kodak Co., 343 State St., Rochester 4, N. Y.
Radiant Manufacturing Corp., 2627 West Roosevelt Rd., Chicago 8, Ill.
Raven Screen Corp., 314–316 East 35th St., New York 16, N. Y.
Vita-Lite Screen Co., 239 A St., San Diego 1, Calif.
David White Sales Co., 315 West Court St., Milwaukee 12, Wis.

Rear Projection Screens

Bodde Projection Screens, 8829 Venice Blvd., Los Angeles 34, Calif.
Commercial Picture Equipment, Inc., 1802 West Columbia, Chicago 26, Ill.
Fowler Co., 750 South Wabash Ave., Chicago, Ill.
Radiant Manufacturing Corp., 2627 Roosevelt Rd., Chicago 8, Ill.
Seminar Films, 347 Madison Ave., New York, N. Y.

Opaque and Overhead Projection Equipment

American Optical Co., Chelsea 50, Mass.
Bausch & Lomb Optical Co., 635 St. Paul, Rochester 2, N. Y.
Charles Beseler Co., 52-72 Badger Ave., Newark, N. J.
Burke and James, Inc., 321 South Wabash Ave., Chicago, Ill.
Keystone View Co., Market & Center Sts., Meadville, Pa.
Squibb-Taylor, Inc., 1213 South Akard, Dallas, Tex.
Victorlite Industries, 4117 West Jefferson Blvd., Los Angeles 16, Calif.

Hand Stereo Viewers

Advertising Displays, Inc., 419 Pike St., Covington, Ky.
Brumberger Sales Corp., 34 – 34th St., Brooklyn, N. Y.
Keystone View Co., Market & Center Sts., Meadville, Pa.
Radex Stereo Co., 1328 West 6th St., Los Angeles 14, Calif.
Sawyer's Inc. (View-Master), Box 490, Portland 7, Ore.
David White Sales Co., 315 West Court St., Milwaukee 12, Wis.

Audio-Visual Accessories (Storage Cabinets, Reels, Rewinders, etc.)

Ampro Corp., 2835 North Western Ave., Chicago 18, Ill.
Bell and Howell Co., 7100 McCormick Road, Chicago 45, Ill.
Brumberger Sales Corp., 34 – 34th St., Brooklyn, N. Y.
Compco Corp., 2251 West St. Paul Ave., Chicago 47, Ill.
Craig Manufacturing Co., 1823 South Hope St., Los Angeles 15, Calif.

Franklin Photographic Industries, Inc., 223 West Erie St., Chicago, Ill.
Goldberg Brothers, P. O. Box 448, Denver 1, Colo.
Griswold Machine Works, 412 Main St., Port Jefferson, N. Y.
Moviola Manufacturing Co., 1451 Gordon St., Hollywood 28, Calif.
Neumade Products Corp., 330 West 42nd St., New York 18, N. Y.
S. O. S. Cinema Supply Corp., 602 West 52nd St., New York 18, N. Y.
Victor Animatograph Corp., Third and Ripley Sts., Davenport, Iowa.

Projection Lamps

General Electric Co., Lamp Dept., Nela Park, Cleveland 12, Ohio.
Radiant Lamp Corp., 300 Jelliff Ave., Newark 8, N. J.
Sylvania Electric Products, Inc., 1740 Broadway, New York 19, N. Y.
Westinghouse Electric Corp., Lamp Div., Bloomfield, N. J.

Cases (Shipping and Carrying)

Brumberger Sales Corp., 34 – 34th St., Brooklyn 32, N. Y.
Compco Corp., 2251 West St. Paul Ave., Chicago 47, Ill.
Durable Fibre Sample Case Co., 207–9 Wooster St., New York, N. Y.
Fiberbilt Case Co., 40 West 17th St., New York 11, N. Y.
Goldberg Brothers, P. O. Box 448, Denver 1, Colo.
Neumade Products Corp., 330 West 42nd St., New York 18, N. Y.
S. O. S. Cinema Supply Corp., 602 West 52nd St., New York 18, N. Y.

16mm. Cameras and Accessories

Bell and Howell Co., 7100 McCormick Road, Chicago 45, Ill.
Berndt-Bach, Inc., 7377 Beverly Blvd., Los Angeles 36, Calif.
Eastman Kodak Co., 343 State St., Rochester 4, N. Y.
Kling Photo Corp., 235 Fourth Ave., New York 3, N. Y.
J. A. Maurer Co., Inc., 37–01 – 31st St., Long Island City, N. Y.
Mitchell Camera Corp., 666 West Harvard St., Glendale 4, Calif.

Television Equipment and Supplies

Dage Electronics Corp., 69 North 2nd St., Beech Grove, Ind.
Allen B. DuMont Laboratories, New York, N. Y.
Eastman Kodak Co., 343 State St., Rochester 4, N. Y.
General Electric Co., Schenectady, N. Y.
General Precision Laboratories, Inc., 63 Bedford Rd., Pleasantville, N. Y.
The Houston-Fearless Corp., 11811 West Olympic Blvd., Los Angeles 64, Calif.
Philco Radio & Television Corp., Philadelphia, Pa.
Radio Corporation of America, Camden, N. J.
Zenith Radio Corporation, Chicago, Ill.

Tape and Disc Recording and Equipment

Ampro Corp., 2839 North Western Ave., Chicago 18, Ill.
Brush Electronics Co., 3405 Perkins Ave., Cleveland 14, Ohio
Columbia Transcriptions Div., 799 7th Ave., New York, N. Y.
DuKane Corp., St. Charles, Ill.
Magnecord, Inc., 225 West Ohio St., Chicago 10, Ill.
Minnesota Mining & Mfg. Co., St. Paul 6, Minn.
Radio Corporation of America, Visual Products Section, Camden, N. J.
Reeves Soundcraft Corp., 10 East 52nd St., New York 22, N. Y.
Revere Camera Co., 320 East 21st St., Chicago 16, Ill.
Stancil-Hoffman Corp., 1016 North Highland Ave., Hollywood 38, Calif.
Universal Recorders, 6757 Hollywood Blvd., Hollywood 28, Calif.
Webster-Chicago Corp., 5610 Bloomingdale, Chicago 39, Ill.
Wilcox-Gay Corp., 585 4th Ave., New York, N. Y.

APPENDIX 3

Television Stations Operating

TELEVISION STATIONS OPERATING

or due to be operating

JULY, 1954

Note: For channel assignments, allocation tables, station and network rates, personnel, etc., see latest *TV Factbook*, published by *Television Digest*. For applications pending for new stations, principals, channels and other facilities requested, etc., consult *TV Factbook* and weekly *Addenda*.

Abilene, Tex. .... KRBC-TV
Ada, Okla. .... KTEN
Adams, Mass. .... WMGT
Akron, O. .... WAKR-TV
Albany, Ga. .... WALB-TV
Albany, N. Y. .... WROW-TV
Albany-Schenectady-Troy, N. Y. .. WTRI
Albuquerque, N. M. .... KOB-TV, KGGM-TV, KOAT-TV
Altoona, Pa. .... WFBG-TV
Amarillo, Tex. .... KFDA-TV, KGNC-TV
Ames, Ia. (Des Moines) .... WOI-TV
Anchorage, Alaska .... KFIA, KTVA
Anderson, S. C. .... WAIM-TV
Ann Arbor, Mich. .... WPAG-TV
Asbury Park, N. J. .... WRTV
Asheville, N. C. .... WISE-TV
Ashtabula, O. .... WICA-TV
Atlanta, Ga. .... WSB-TV, WAGA-TV, WLWA
Augusta, Ga. ... WJBF-TV, WRDW-TV
Austin, Minn. .... KMMT
Austin, Tex. .... KTBC-TV
Bakersfield, Cal. .... KBAK-TV, KERO-TV
Baltimore, Md. .... WBAL-TV, WAAM, WMAR-TV
Bangor, Me. .... WABI-TV
Baton Rouge, La. .... WAFB-TV
Bay City, Mich. .... WNEM-TV
Beaumont, Tex. .... KBMT
Belleville, Ill. (St. Louis) .... WTVI
Bellingham, Wash. .... KVOS-TV
Bethlehem, Pa. .... WLEV-TV
Billings, Mont. .... KOOK-TV
Binghamton, N. Y. .... WNBF-TV
Birmingham, Ala. .... WBRC-TV, WABT
Bismarck, N. D. .... KFYR-TV
Bloomington, Ill. .... WBLN
Bloomington, Ind. .... WTTV
Boise, Ida. .... KIDO-TV, KBOI
Boston, Mass. .... WBZ-TV, WNAC-TV

Bridgeport, Conn. .... WICC-TV
Buffalo, N. Y. .. WBEN-TV, WBUF-TV, WGR-TV
Butte, Mont. ..... KOPR-TV, KXLF-TV
Cadillac, Mich. .... WWTV
Cambridge, Mass. .... WTAO-TV
Cedar Rapids, Ia. .. KCRI-TV, WMT-TV
Chambersburg, Pa. .... WCHA-TV
Champaign, Ill. .... WCIA
Charleston, S. C. .... WCSC-TV
Charleston, W. Va. .... WKNA-TV, WCHS-TV
Charlotte, N. C. ..... WAYS-TV, WBTV
Chattanooga, Tenn. .... WDEF-TV
Cheyenne, Wyo. .... KFBC-TV
Chicago, Ill. .... WNBQ, WBKB, WBBM-TV, WGN-TV
Chico, Cal. .... KHSL-TV
Cincinnati, O. ..... WLWT, WCPO-TV, WKRC-TV, WCET
Cleveland, O. .... WNBK, WEWS, WXEL
Colorado Springs, Colo. ...... KKTV, KRDO-TV
Columbia, Mo. .... KOMU-TV
Columbia, S. C. .. WCOS-TV, WIS-TV, WNOK-TV
Columbus, Ga. .. WDAK-TV, WRBL-TV
Columbus, O. ..... WLWC, WBNS-TV, WTVN
Corpus Christi, Tex. .... KVDO-TV
Dallas, Tex. ..... WFAA-TV, KRLD-TV
Danville, Ill. .... WDAN-TV
Danville, Va. .... WBTM-TV
Davenport, Ia. .... WOC-TV
Dayton, O. .... WLW-D, WHIO-TV
Decatur, Ala. .... WMSL-TV
Decatur, Ill. .... WTVP
Denver, Colo. ...... KFEL-TV, KBTV, KLZ-TV, KOA-TV
Des Moines, Ia. ...... KGTV, WHO-TV
Detroit, Mich. .... WWJ-TV, WJBK-TV, WXYZ-TV
Duluth, Minn. .... KDAL-TV, WDSM-TV
East Lansing, Mich. .... WKAR-TV
Easton, Pa. .... WGLV
Eau Claire, Wis. .... WEAU-TV
Elkhart, Ind. .... WSJV
Elmira, N. Y. .... WTVE
El Paso, Tex. .... KROD-TV, KTSM-TV
Enid, Okla. .... KGEO-TV
Erie, Pa. .... WICU, WSEE
Eugene, Ore. .... KVAL-TV
Eureka, Cal. .... KIEM-TV
Evansville, Ind. .... WFIE
Fairbanks, Alaska .... KFIF
Fairmont, W. Va. .... WJPB-TV
Fargo, N. D. .... WDAY-TV
Fort Dodge, Ia. .... KQTV
Fort Lauderdale, Fla. ...... WFTL-TV, WITV
Fort Myers, Fla. .... WINK-TV
Fort Smith, Ark. .... KFSA-TV
Fort Wayne, Ind. .... WKJG-TV
Fort Worth, Tex. .... WBAP-TV
Fresno, Cal. .... KMJ-TV, KJEO, KBID
Galveston, Tex. .... KGUL-TV
Grand Junction, Colo. .... KXFJ-TV
Grand Rapids, Mich. .... WOOD-TV
Great Falls, Mont. .... KFBB-TV
Green Bay, Wis. .... WBAY-TV
Greensboro, N. C. .... WFMY-TV
Greenville, N. C. .... WNCT
Greenville, S. C. ... WFBC-TV, WGVL
Hampton (Norfolk), Va. .... WVEC-TV
Hannibal, Mo. .... KHQA
Harlingen, Tex. .... KGBT-TV
Harrisburg, Ill. .... WSIL-TV
Harrisburg, Pa. ...... WHP-TV, WTPA
Harrisonburg, Va. .... WSVA-TV
Hartford, Conn. .... WGTH-TV
Henderson, Ky. .... WEHT
Holyoke (Springfield), Mass. WHYN-TV
Honolulu, Hawaii .. KGMB-TV, KONA, KULA-TV
Houston, Tex. .... KPRC-TV, KUHT
Huntington, W. Va. .... WSAZ-TV
Hutchinson, Kan. .... KTVH
Idaho Falls, Ida. .... KID-TV
Indianapolis, Ind. .... WFBM-TV, WISH-TV
Jackson, Miss. .... WJTV, WLBT, WSLI-TV
Jacksonville, Fla. .... WJHP-TV, WMBR-TV
Johnson City, Tenn. .... WJHL-TV
Johnstown, Pa. .. WARD-TV, WJAC-TV
Kalamazoo, Mich. .... WKZO-TV
Kansas City, Mo. .... WDAF-TV, KCMO-TV, KMBC-TV
Kearney, Neb. .... KHOL-TV
Kingston, N. Y. .... WKNY-TV
Knoxville, Tenn. .... WTSK-TV, WATE
La Crosse, Wis. .... WKBT
Lafayette, Ind. .... WFAM-TV
Lake Charles, La. .... KTAG-TV
Lancaster, Pa. .... WGAL-TV
Lansing, Mich. ... WJIM-TV, WILS-TV
Las Vegas, Nev. .... KLAS-TV
Lawton, Okla. .... KSWO-TV
Lebanon, Pa. .... WLBR-TV
Lewiston, Me. .... WLAM-TV
Lima, O. .... WLOK-TV
Lincoln, Neb. .... KOLN-TV
Little Rock, Ark. .... ARK
Longview, Tex. .... KTVE

Los Angeles, Cal. . . . KNBH, KABC-TV, KHJ-TV, KCOP, KTLA, KNXT, KTTV, KTHE
Louisville, Ky. . . WAVE-TV, WHAS-TV
Lubbock, Tex. . . . KCBD-TV, KDUB-TV
Lynchburg, Va. . . . . WLVA-TV
Macon, Ga. . . . . WNEX-TV
Madison, Wis. . . WHA-TV, WKOW-TV, WMTV
Manchester, N. H. . . . . WMUR-TV
Mason City, Ia. . . . . KGLO-TV
Medford, Ore. . . . . KBES-TV
Memphis, Tenn. . . . WMCT, WHBQ-TV
Meridian (Boise), Ida. . . . . KBOI
Meridian, Miss. . WCOC-TV, WTOK-TV
Mesa (Phoenix), Ariz. . . . . KVAR
Miami, Fla. . . . . WTVJ
Midland, Tex. . . . . KMID-TV
Milwaukee, Wis. . . . . WTMJ-TV, WCAN-TV, WOKY-TV
Minneapolis-St. Paul, Minn. . . KSTP-TV, WCCO-TV, WTCN-TV, WMIN-TV
Minot, N. D. . . . . KCJB-TV
Missoula, Mont. . . . . KGVO-TV
Mobile, Ala. . . . WALA-TV, WKAB-TV
Monroe, La. . . . . KNOE-TV
Monterey, Cal. . . . . KMBY-TV
Montgomery, Ala. . . . . WCOV-TV
Muncie, Ind. . . . . WLBC-TV
Nashville, Tenn. . . WSM-TV, WSIX-TV, WLAC-TV
Neenah, Wis. . . . . WNAM-TV
New Britain, Conn. . . . . WKNB-TV
New Castle, Pa. . . . . WKST-TV
New Haven, Conn. . . . . WNHC-TV
New Orleans, La. . . . . WDSU-TV, WJMR-TV
New York, N. Y. . . . . . WNBT, WABD, WCBS-TV, WABC-TV, WOR-TV, WPIX
Newark, N. J. . . . . WATV
Norfolk, Va. . . . . WTAR-TV, WTOV-TV
Oklahoma City, Okla. . . . . WKY-TV, KMPT, KTVQ, KWTV
Omaha, Neb. . . . . WOW-TV, KMTV
Orlando, Fla. . . . . WDBO-TV
Panama City, Fla. . . . . WJDM
Parkersburg, W. Va. . . . . WTAP
Pensacola, Fla. . . WPFA-TV, WEAR-TV
Peoria, Ill. . . . . . WEEK-TV, WTVH-TV
Philadelphia, Pa. . . . WPTZ, WCAU-TV, WFIL-TV
Phoenix, Ariz. . . . KPHO-TV, KOOL-TV, KOY-TV
Pine Bluff, Ark. . . . . KATV
Pittsburg, Kan. . . . . KOAM-TV
Pittsburgh, Pa. . . WDTV, WENS, WQED
Portland, Me. . . . . . . WPMT, WCSH-TV, WGAN-TV
Portland, Ore. . . . . KPTV, KOIN-TV
Providence, R. I. . . . . WJAR-TV, WNET
Pueblo, Colo. . . . . KCSJ-TV
Quincy, Ill. . . . . WGEM-TV
Raleigh, N. C. . . . . WNAO-TV
Reading, Pa. . . . WEEU-TV, WHUM-TV
Reno, Nev. . . . . KZTV
Richmond, Va. . . . . WTVR
Roanoke, Va. . . . . WSLS-TV
Rochester, Minn. . . . . KROC-TV
Rochester, N. Y. . . . . WHAM-TV, WHEC-TV, WVET-TV
Rockford, Ill. . . . . . . WTVO, WREX-TV
Rock Island, Ill. . . . . WHBF-TV
Rome, Ga. . . . . WROM-TV
Roswell, N. M. . . . . KSWS-TV
Sacramento, Cal. . . . . KCCC-TV
Saginaw, Mich. . . . . WKNX-TV
Salinas, Cal. . . . . KSBW-TV
Salisbury, Md. . . . . WBOC-TV
Salt Lake City, Utah . . . . KTVT, KSL-TV
San Angelo, Tex. . . . . KTXL-TV
San Antonio, Tex. . . . . WOAI-TV, KGBS-TV
San Diego, Cal. . . KFMB-TV, KFSD-TV
San Francisco, Cal. . . . . KRON-TV, KGO-TV, KPIX, KQED, KSAN-TV
San Juan, P. R. . . . . WKAQ-TV, WAPA-TV
San Luis Obispo, Cal. . . . . . . KVEC-TV
Santa Barbara, Cal. . . . . KEYT
Savannah, Ga. . . . . WTOC-TV
Schenectady, N. Y. . . . . WRGB
Scranton, Pa. . . . . . WGBI-TV, WTVU, WARM-TV
Seattle, Wash. . . . KING-TV, KOMO-TV
Sedalia, Mo. . . . . KDRO-TV
Shreveport, La. . . . . KSLA
Sioux City, Ia. . . . . KVTV
Sioux Falls, S. D. . . . . KELO-TV
South Bend, Ind. . . . . WSBT-TV
Spokane, Wash. . . . KHQ-TV, KXLY-TV
Springfield, Ill. . . . . WICS
Springfield, Mass. . . . . WWLP
Springfield, Mo. . . . . KTTS-TV, KYTV
St. Joseph, Mo. . . . . KFEQ-TV
St. Louis, Mo. . . . . KSD-TV, KSTM-TV, KWK-TV
St. Petersburg, Fla. . . . . WSUN-TV
Steubenville, O. . . . . WSTV-TV
Stockton, Cal. . . . . KTVU
Syracuse, N. Y. . . . . . WSYR-TV, WHEN
Tacoma, Wash. . . . KTNT-TV, KMO-TV
Temple, Tex. . . . . KCEN-TV
Terre Haute, Ind. . . . . WTHI-TV
Texarkana, Tex. . . . . KCMC-TV

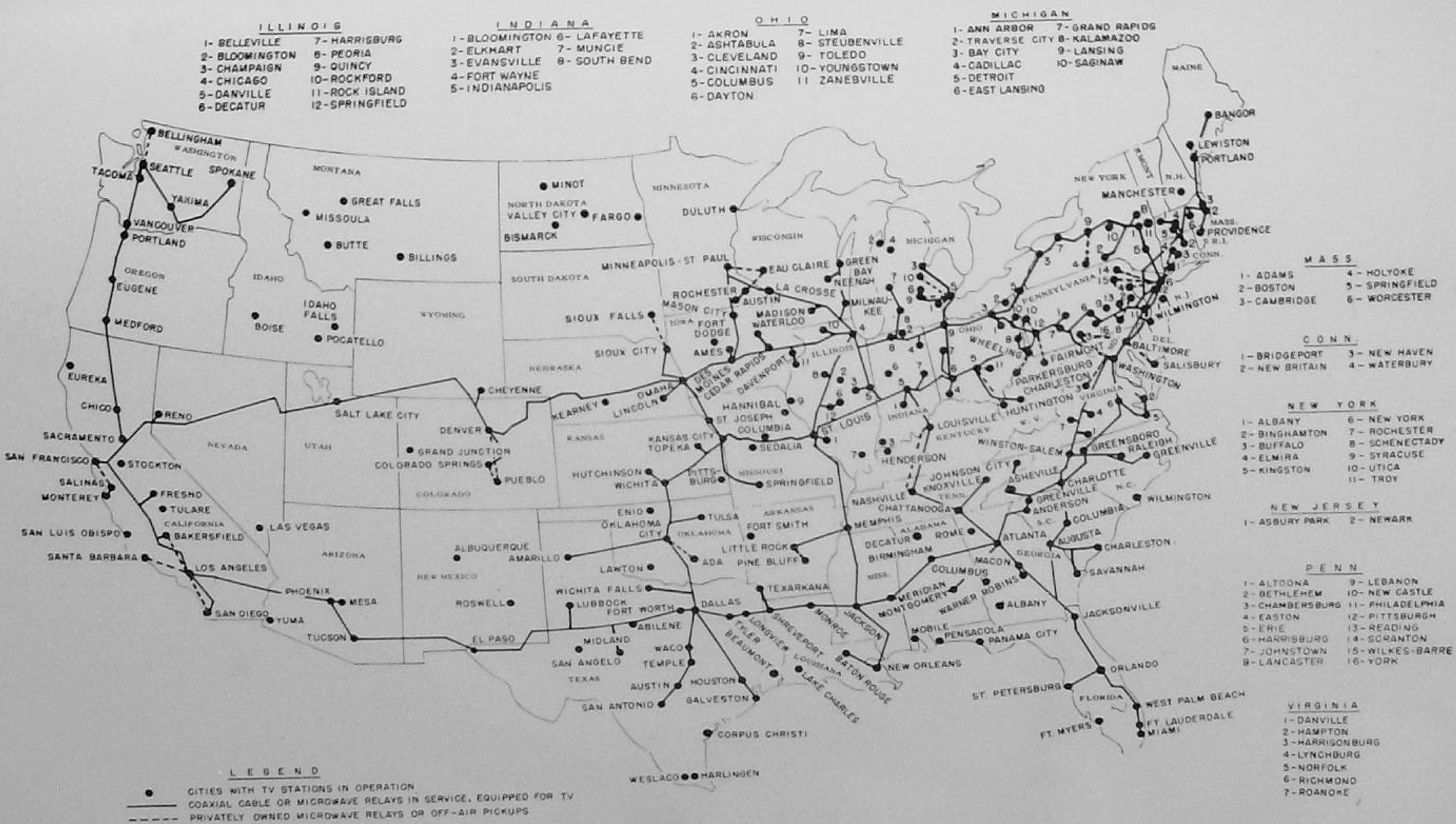
Toledo, O. .... WSPD-TV
Topeka, Kan. .... WIBW-TV
Traverse City, Mich. .... WPBN-TV
Tucson, Ariz. .... KOPO-TV, KVOA-TV
Tulare, Cal. .... KVVG
Tulsa, Okla. .... KOTV, KCEB
Tyler, Tex. .... KETX
Utica, N. Y. .... WKTV
Valley City, N. D. .... KXJB-TV
Vancouver, Wash. .... KVAN-TV
Waco, Tex. .... KANG-TV
Warner Robins (Macon), Ga. WMAZ-TV
Washington, D. C. WNBW, WMAL-TV, WTOP-TV, WTTG
Waterbury, Conn. .... WATR-TV
Waterloo, Ia. .... KWWL-TV
Weslaco, Tex. .... KRGV-TV
West Palm Beach, Fla. .... WIRK-TV
Wheeling, W. Va. .... WTRF-TV
Wichita, Kan. .... KEDD
Wichita Falls, Tex. .... KFDX-TV, KWFT-TV
Wilkes-Barre, Pa. WBRE-TV, WILK-TV
Wilmington, Del. .... WDEL-TV
Winston-Salem, N. C. .... WSJS-TV, WTOB-TV
Worcester, Mass. .... WWOR-TV
Yakima, Wash. .... KIMA-TV
York, Pa. ...... WSBA-TV, WNOW-TV
Youngstown, O. .. WFMJ-TV, WKBN-TV
Yuma, Ariz. .... KIVA
Zanesville, O. .... WHIZ-TV

CANADA

Hamilton, Ont. .... CHCH-TV
Kitchener, Ont. .... CKCO-TV
London, Ont. .... CFPL-TV
Montreal, Que. .... CBMT, CBFT
Ottawa, Ont. .... CBOT
Quebec City, Que. .... CFCM-TV
Regina, Sask. .... CKCK-TV
St. John, N. B. .... CHSJ-TV
Sudbury, Ont. .... CKSO-TV
Toronto, Ont. .... CBLT
Vancouver, B. C. .... CBUT
Winnipeg, Man. .... CBWT

MEXICO

Juarez (El Paso, Tex.) .... XEJ-TV
Tijuana (San Diego, Cal.) .... XETV


ILLINOIS
1- BELLEVILLE
2- BLOOMINGTON
3- CHAMPAIGN
4- CHICAGO
5- DANVILLE
6- DECATUR
7- HARRISBURG
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9- QUINCY
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11- ROCK ISLAND
12- SPRINGFIELD
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3- EVANSVILLE
4- FORT WAYNE
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6- LAFAYETTE
7- MUNCIE
8- SOUTH BEND
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2- NEWARK
PENN
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13- READING
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2- HAMPTON
3- HARRISONBURG
4- LYNCHBURG
5- NORFOLK
6- RICHMOND
7- ROANOKE
LEGEND
CITIES WITH TV STATIONS IN OPERATION
COAXIAL CABLE OR MICROWAVE RELAYS IN SERVICE, EQUIPPED FOR TV
PRIVATELY OWNED MICROWAVE RELAYS OR OFF-AIR PICKUPS
BELLINGHAM
SEATTLE
TACOMA
SPOKANE
YAKIMA
VANCOUVER
PORTLAND
EUGENE
MEDFORD
EUREKA
CHICO
SACRAMENTO
SAN FRANCISCO
STOCKTON
SALINAS
MONTEREY
FRESNO
TULARE
BAKERSFIELD
SAN LUIS OBISPO
SANTA BARBARA
LOS ANGELES
SAN DIEGO
YUMA
RENO
LAS VEGAS
PHOENIX
MESA
TUCSON
GREAT FALLS
MISSOULA
BUTTE
BILLINGS
BOISE
IDAHO FALLS
POCATELLO
SALT LAKE CITY
CHEYENNE
DENVER
GRAND JUNCTION
COLORADO SPRINGS
PUEBLO
ALBUQUERQUE
ROSWELL
EL PASO
MINOT
VALLEY CITY
FARGO
BISMARCK
DULUTH
MINNEAPOLIS-ST PAUL
SIOUX FALLS
SIOUX CITY
KEARNEY
LINCOLN
OMAHA
ROCHESTER
MASON CITY
FORT DODGE
AMES
AUSTIN
EAU CLAIRE
LA CROSSE
GREEN BAY
NEENAH
MILWAUKEE
MADISON
WATERLOO
DES MOINES
CEDAR RAPIDS
DAVENPORT
HANNIBAL
ST JOSEPH
COLUMBIA
KANSAS CITY
TOPEKA
SEDALIA
ST LOUIS
SPRINGFIELD
HUTCHINSON
WICHITA
PITTSBURG
ENID
OKLAHOMA CITY
TULSA
ADA
LAWTON
AMARILLO
FORT SMITH
LITTLE ROCK
PINE BLUFF
WICHITA FALLS
LUBBOCK
FORT WORTH
DALLAS
ABILENE
MIDLAND
SAN ANGELO
WACO
TEMPLE
AUSTIN
SAN ANTONIO
HOUSTON
GALVESTON
CORPUS CHRISTI
WESLACO
HARLINGEN
TEXARKANA
TYLER
LONGVIEW
BEAUMONT
SHREVEPORT
MONROE
LAKE CHARLES
BATON ROUGE
NEW ORLEANS
JACKSON
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CHATTANOOGA
DECATUR
BIRMINGHAM
ROME
MERIDIAN
MONTGOMERY
COLUMBUS
MOBILE
PENSACOLA
PANAMA CITY
ALBANY
WARNER ROBINS
MACON
ATLANTA
AUGUSTA
COLUMBIA
ANDERSON
GREENVILLE
CHARLOTTE
ASHEVILLE
CHARLESTON
SAVANNAH
JACKSONVILLE
ORLANDO
ST PETERSBURG
FT MYERS
WEST PALM BEACH
FT LAUDERDALE
MIAMI
LOUISVILLE
HENDERSON
JOHNSON CITY
KNOXVILLE
HUNTINGTON
CHARLESTON
PARKERSBURG
FAIRMONT
WHEELING
WINSTON-SALEM
GREENSBORO
RALEIGH
GREENVILLE
WILMINGTON
WASHINGTON
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